

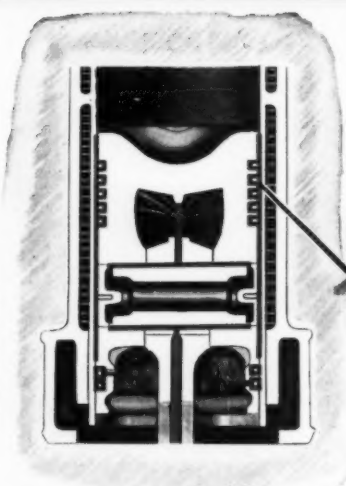
# DIESEL PROGRESS



JANUARY, 1942

# The Seal that points to Full Power

"ABSOLUTELY NO RING STICKING, less carbon, better filtration, better overall efficiency . . ." says Mr. Charles G. Hill of Point Pleasant, N. J., on his experience with *Texaco Ursa Oil* in his 12½" x 18" Cooper-Bessemer Diesel.



NO PASSES FOR  
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**YOUR DIESEL PISTON RINGS** stay free in their grooves . . . continuously assuring compression seal that means full power-output and maximum fuel economy . . . when you use *Texaco Algol* or *Ursa Oils*.

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*More stationary Diesel horsepower in the U. S. is lubricated with Texaco than with any other brand.*

The outstanding performance that has made Texaco **FIRST** in the stationary Diesel field, has made it **FIRST** also in the fields listed in the panel.

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★ More stationary Diesel horsepower in the U. S. is lubricated with Texaco than with any other brand.

★ More Diesel horsepower on streamlined trains in the U. S. is lubricated with Texaco than with all other brands combined.

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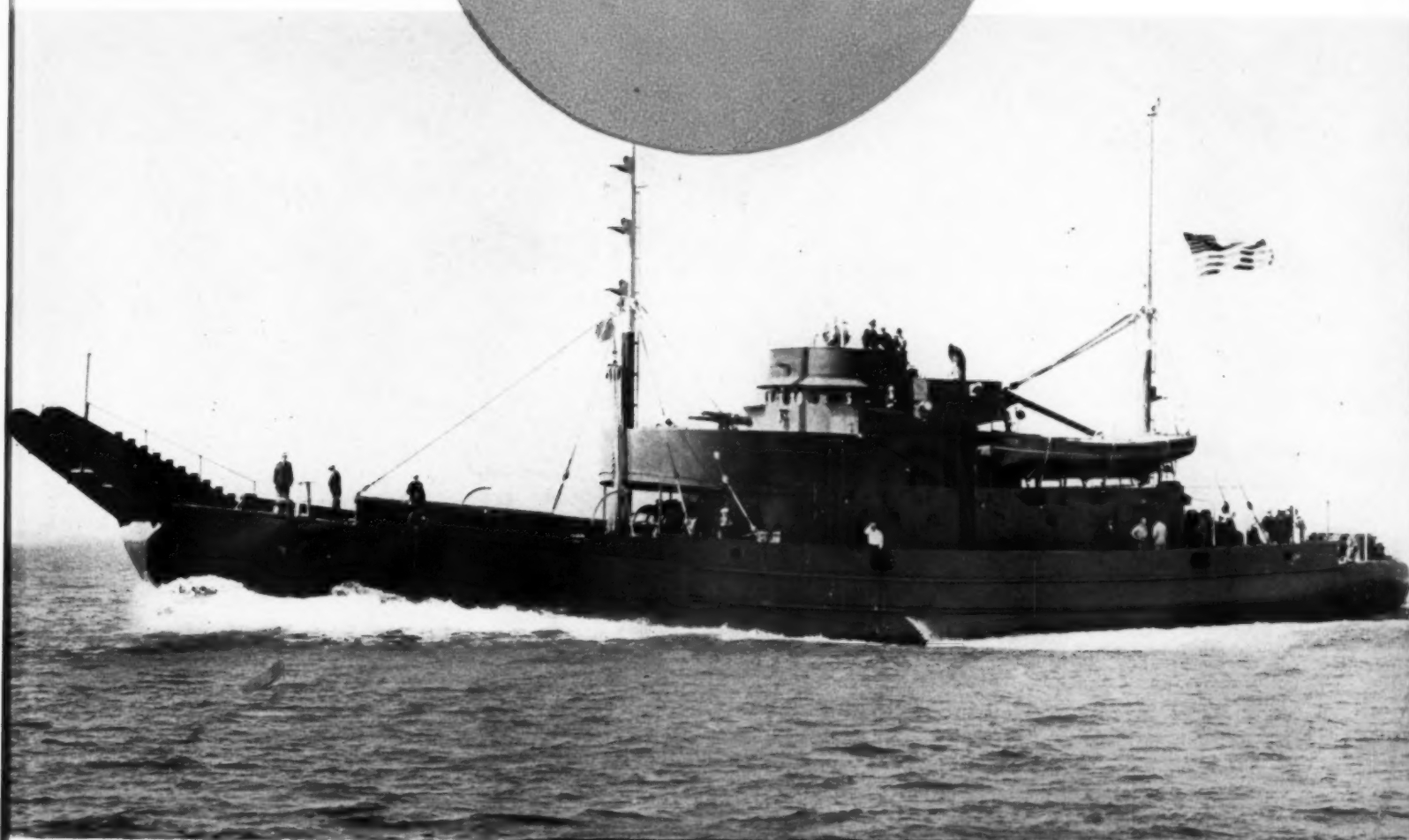
# TEXACO Lubricants and Fuels

## FOR ALL DIESEL ENGINES

RETURN METAL DRUMS PROMPTLY . . . thus helping to make present supply meet industry's needs and releasing metal for National Defense.

**DIESEL PROGRESS** for January, 1942. Volume VIII, Number 1. **DIESEL PROGRESS** is published monthly by Diesel Engines, Inc., 2 West Forty-fifth Street, New York, N. Y. Rex W. Wadman, President. Acceptance under the Act of June 5, 1934, at East Stroudsburg, Pa., authorized March 27, 1940. Subscription rates: United States and Possessions \$3.00. Canada and all other countries \$5.00 per year. Single copy price 25 cents in U. S. A., 50 cents for all other countries.

# DIESEL *and* GAS ENGINE PROGRESS



**REX W. WADMAN**  
*Editor and Publisher*

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**FRONT COVER ILLUSTRATION:** "Chanticleer", one of the outstanding private yachts built in 1941. This handsome 65 ft. yacht is powered with a pair of Gray Marine Diesels, 110 hp. each at 2000 rpm. Details of the "Chanticleer" appeared in last month's issue of DIESEL PROGRESS.

**TABLE OF CONTENTS ILLUSTRATION:** The Navy's VN class Net Tender "Eucalyptus" on trial run in San Francisco Bay. Powered with dual Enterprise Diesel-electric propulsion units, she is the first of a fleet of twelve vessels ordered for the Navy.

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**HEYWORTH CAMPBELL**  
*Art Director*

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# CONWAY, ARKANSAS

By WILLIAM H. GOTTLIEB

**T**HE year 1929 was a black one for Conway, Arkansas, but it marked the beginning of a great expansion and improvement of the city's power system. Conway is the educational center of a broad area, but in 1929 its colleges were in bad straits and threatened with complete financial collapse. The municipal government was in no position to offer financial aid. Only the city's small, 620-hp. Diesel generating plant offered hope of saving the situation. The Conway Corporation, a non-profit company, was formed to operate the power system and to issue \$215,000 worth of bonds against potential earnings of the plant. Here is the disposition of the money:

Hendrix College .....	\$150,000.00
Central College .....	\$ 43,000.00
Arkansas Teachers College ..	\$ 2,000.00
(for experimental farm)	
Public Schools .....	\$ 10,000.00
Parochial Schools .....	\$ 10,000.00

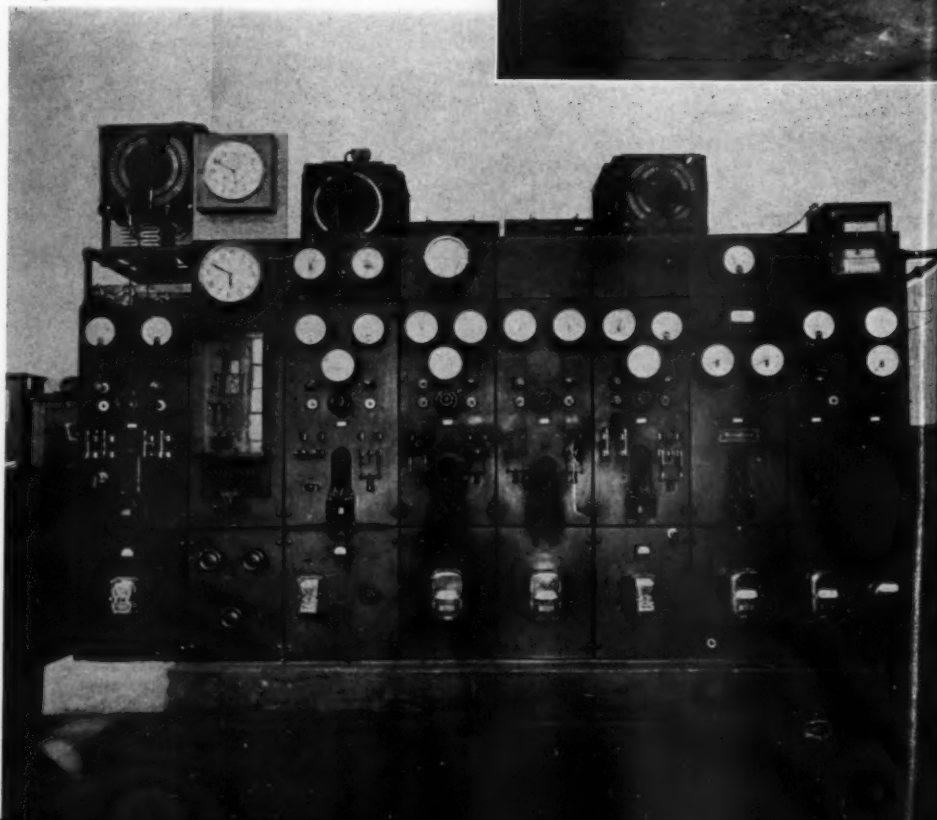
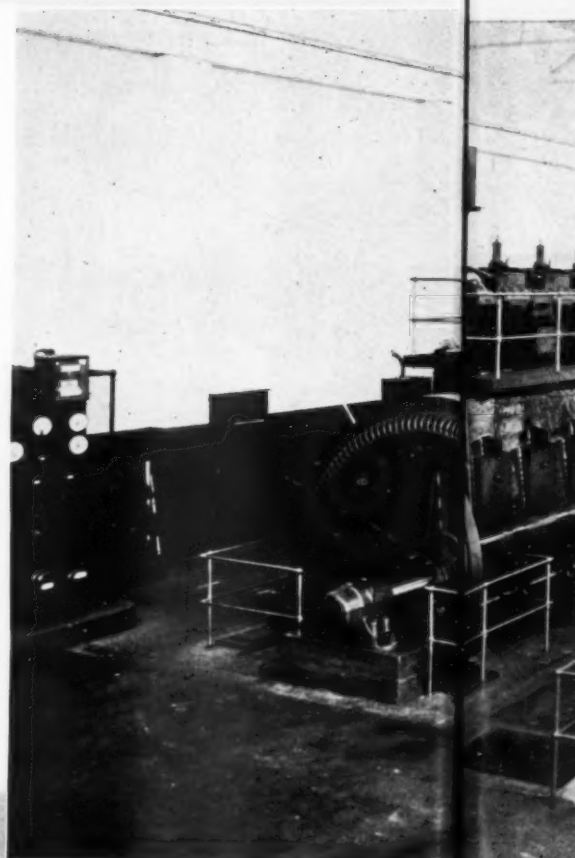
The progress made since 1929 has been impressive. The plant has increased from 620 hp. to 2995 hp., with addition of a 625 hp. Fulton Diesel in 1929, a 750 hp. Fulton in 1934, and a 1000 hp. Fulton in 1940. Conway already has paid from plant earnings, \$125,000.00, all but \$10,000 of the total cost of plant improvement. In addition, the Conway Corp. has paid off \$110,000 of the sum donated to the educational institutions. The city gets a further contribution of \$6,000 in cash and \$7,500 in free services each year, a total of \$162,000 for the twelve-year period. At the same time that the plant was making its enormous cash contributions, the consumer rates for electricity were cut nearly in half.

Conway has operated its own power plant for more than fifty years, starting in 1890 with a

small steam plant. In 1924, the first Diesel was installed, a four cylinder, 14½ in. x 18 in., four cycle, mechanical injection De La Vergne Diesel rated at 260 hp. at 277 rpm. A year later, a six cylinder, 14 in. x 15½ in., two cycle, mechanical injection Fairbanks-Morse Diesel developing 360 hp. at 257 rpm. was added to the plant. The period of major development, under the aegis of the Conway Corp., began in 1929 with the installation of the 625 hp. five cylinder, four cycle, air injection Fulton Diesel. Like all subsequent acquisitions, this engine has 17 in. bore and 24½ in. stroke and develops its rating at 225 rpm. When the 750 hp., six cylinder, air injection Fulton was installed in 1934, the steam engine was removed and the plant, at last, was all Diesel. The greatest

Here are seen the three Fulton Diesels and the Fairbanks-Morse Diesel, four of the five generating units at Conway.

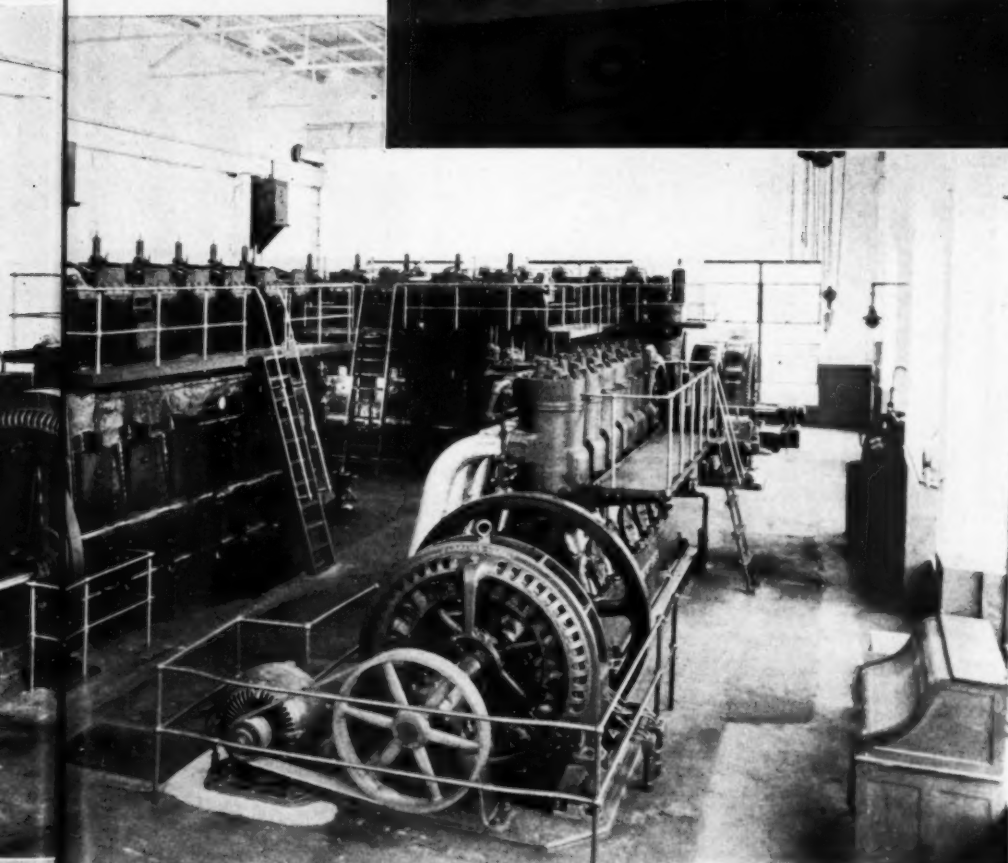
The Westinghouse main switch-board.







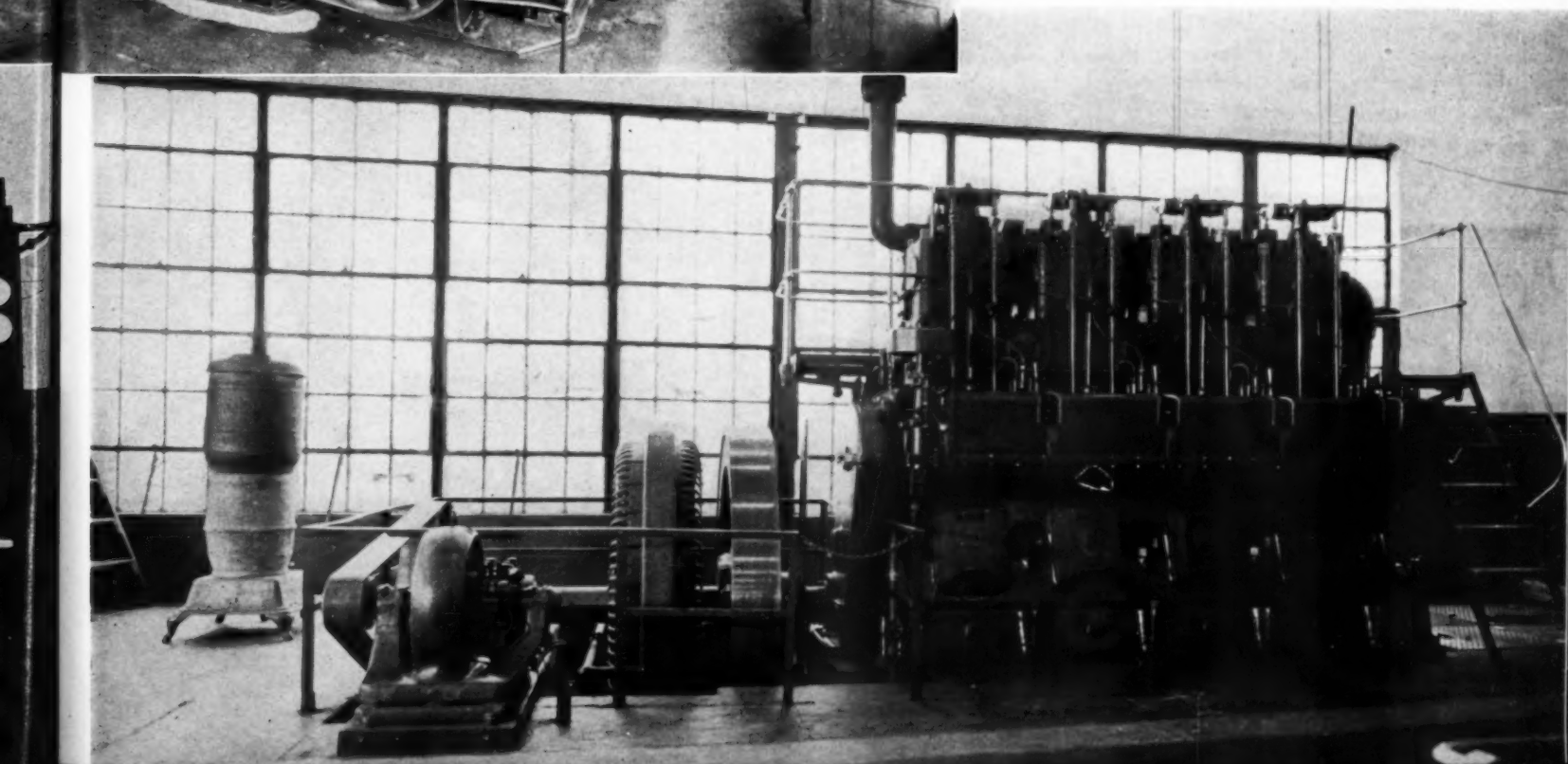
*Night view of the Conway, Arkansas, municipal power plant which houses five Diesels totaling 3000 hp.*

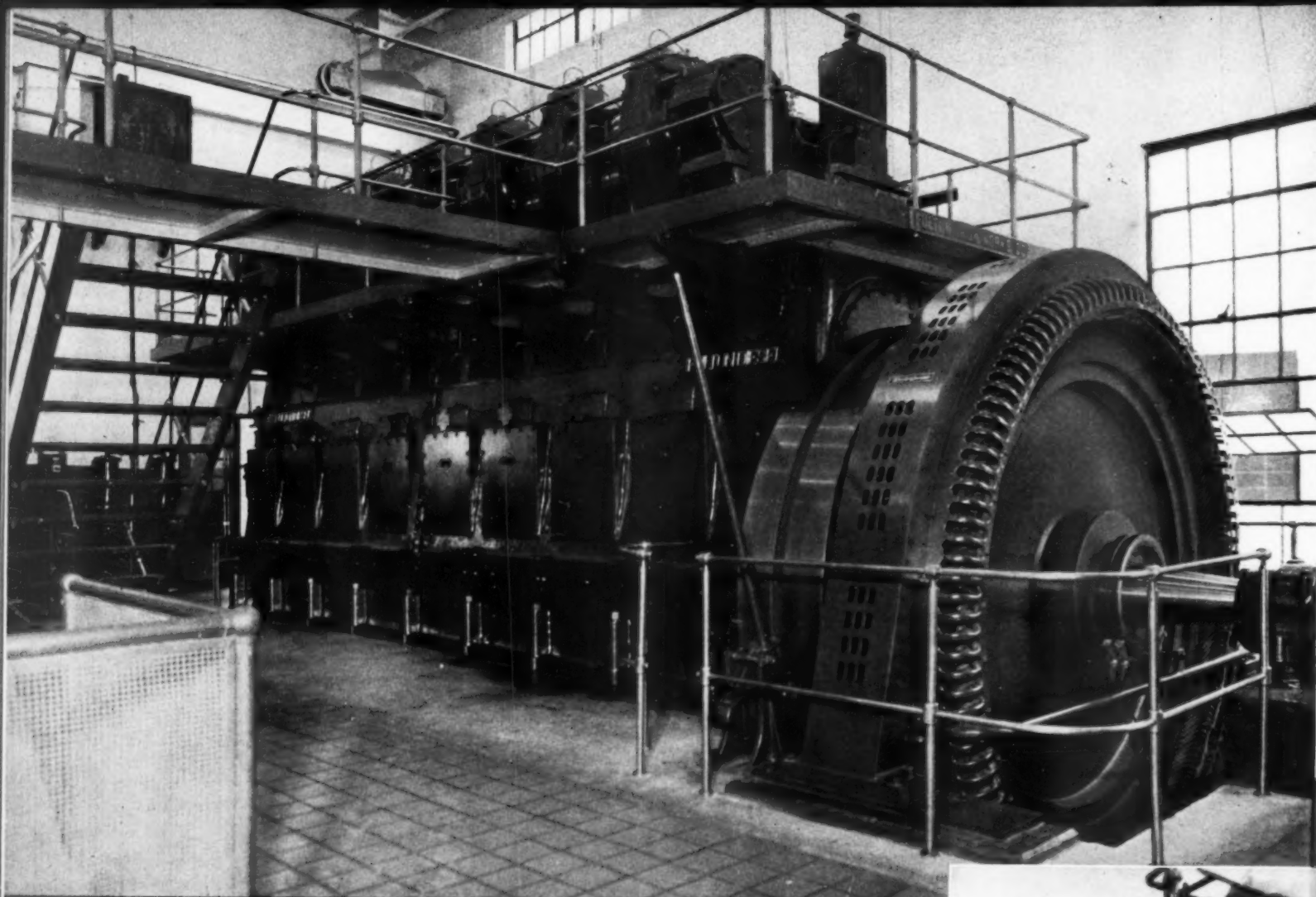


single advance came in 1940 with the acquisition of the 1000 hp., eight cylinder, mechanical injection Fulton Diesel.

All the engines are direct-connected to two-phase, 60 cycle, 2300 volt alternators. The two oldest engines have belted exciters while the five cylinder Fulton has a direct connected exciter. The two largest engines depend for excitation on a motor-generator set which is large enough to supply the entire Conway plant. The increase in the size of the plant is in-

*The oldest Diesel at Conway, a 260 hp. De La Vergne engine installed in 1924.*



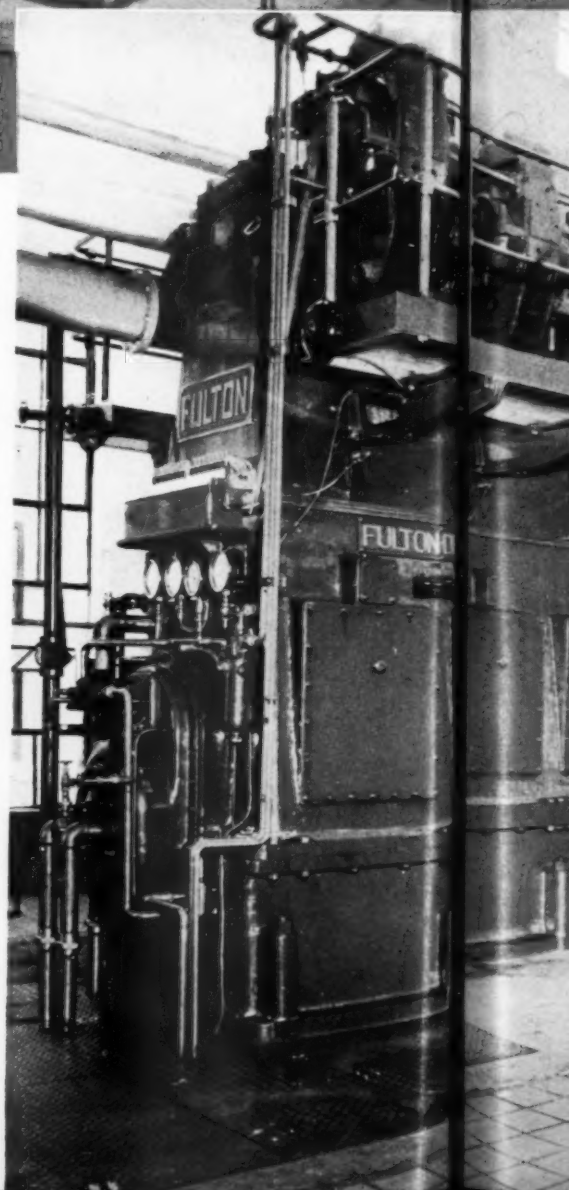


*The newest and largest engine in the Conway plant, a 1000 hp. Fulton Diesel direct connected to a Westinghouse alternator. Note Woodward governor, upper right.*

dication, of course, of a great rise in consumption of electricity, and this has been accompanied by a continuous improvement in plant efficiency and economy. In the year ending June 30, 1941, kilowatt-hour production reached an all time peak of 3,530,700 with peak loads of more than 1100 kilowatts. The average for the entire plant was better than 12 kw. hrs. per gallon of fuel consumed and the new engine is showing fuel economy consistently better than 13 kw. hrs. per gallon.

As for the physical arrangement of the plant and the methods of operation, principal interest naturally centers in the newest and largest engine and this discussion, consequently, will give primary attention to the 1000 hp. unit and its accessories. Fuel is purchased in tank car lots and the City obtains a 30 to 32 gravity oil for a delivered price of four and one-eighth cents per gallon. To permit quantity purchases, the plant has storage tanks with a total capacity of 60,000 gallons located above ground near the railroad where fuel can be unloaded

directly from the tank cars with a motor-driven centrifugal pump. Fuel flows by gravity to the large engine's day tank below ground just outside the plant and there it is picked up by an engine-driven pump which supplies oil to a fuel header under 35 pounds pressure. The battery of injection pumps, one for each cylinder, draws fuel from the header and sends it through spray nozzles into the cylinders. A hydraulic relay-type governor controls the opening of a bypass valve in each injection pump and thus regulates the quantity of fuel delivered to each cylinder. Edge type filters have been placed in the fuel line between the storage tank and the day tank, and between the day tank and the engine. Each engine in the plant has a fuel meter. In the case of the 1000 hp. unit, the meter is located between the storage and day tanks since there is an overflow return line from the injection pump suction header to the day tank. The other Fulton engines have elevated day tanks supplied with fuel by motor-driven rotary pumps controlled automatically by floats in the tanks.



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The Fulton engines have two-compartment sump tanks beneath the floor at the head of each engine and this is used to provide a "rotation" of lubricating oil supply. For a week of operation, oil is drawn from one compartment by an engine-driven gear pump and sent under pressure to the main bearings and piston pin bearings returning to the same compartment of the sump. At the end of the week, a fresh supply of clean oil in the second compartment is purified in an activated clay reclaimer. Tests of the oil show it to be in excellent condition and it is seldom necessary to add oil to the crankcase supply in the course of operation. Each engine has an oil cooler in its circulating system. Cylinders are supplied by mechanical lubricators. The new engine returns nearly 8000 hp. hrs. for each gallon of lubricating oil consumed.

The cooling water system is novel in that the entire plant is supplied by gravity feed from a 30,000 gallon tank elevated 50 feet. Water from the engine jackets flows to a common hot well. A 350 gpm. motor-driven centrifugal

pump takes water from this well and sends it through a set of sprays into a pond. The water, cooled atmospherically, is picked up by one of two motor-driven centrifugal pumps and lifted to the elevated tank. To complete the circuit, the water flows by gravity to the engine jackets. One pump is sufficient to supply water to the tank and if this pump fails, there is enough water in the tank to keep the engines cool until the operator starts the alternate pump, a very efficient arrangement.

All three of the larger engines have alarm systems which warn the operator if either lubricating oil pressure or cooling water pressure begins to drop. An alarm sounds, also, if the fuel level in the day tanks is either too high or too low. Alarms are heard rarely in the Conway plant. There are five operators beside the Chief Engineer and the men keep a close check on the condition of their equipment. On the end of each big engine is a group of gauges and thermometers showing at a glance the important pressures and temperatures in the fuel, lubricating oil and cooling water systems.

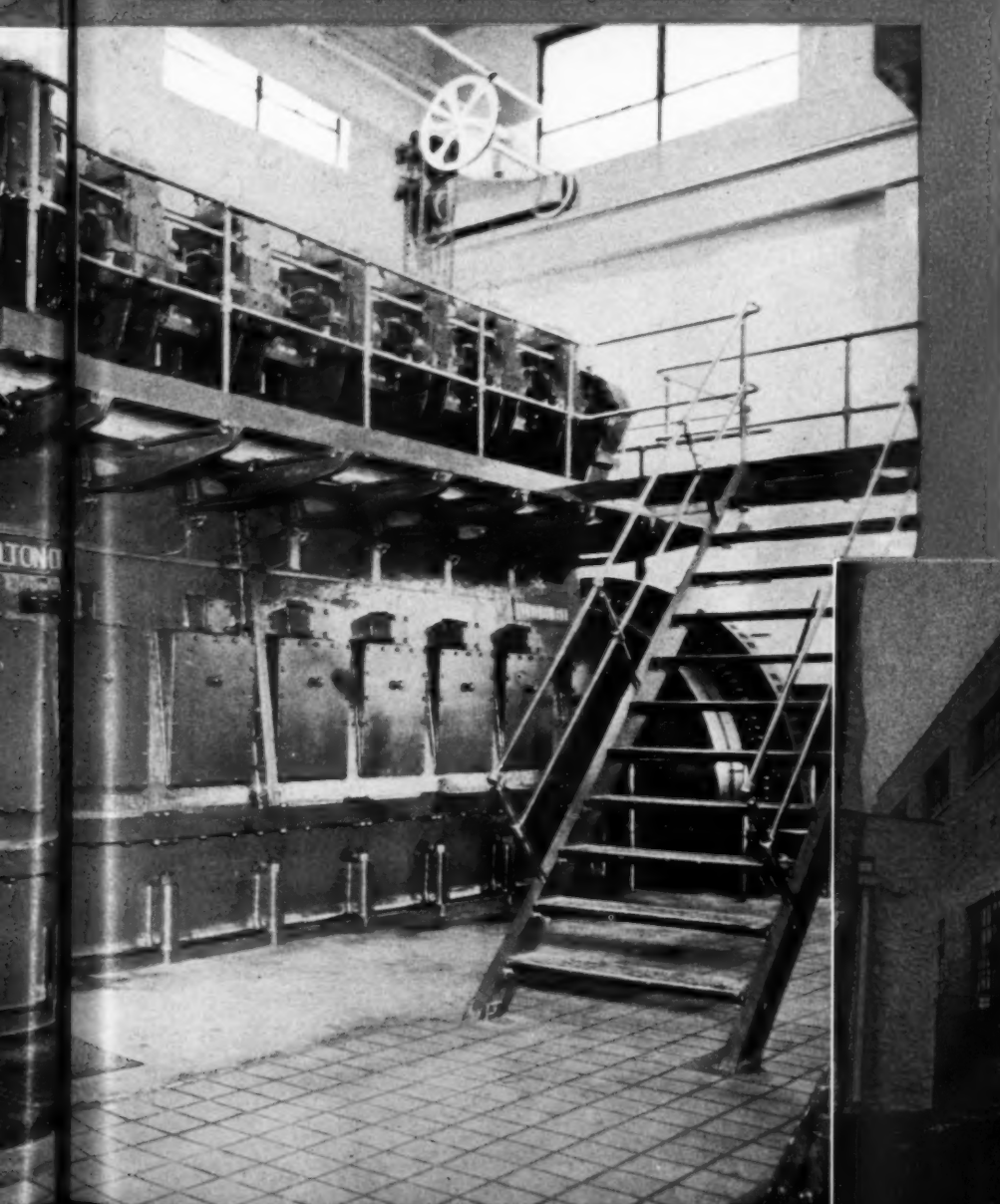
An exhaust pyrometer for each engine gives the exhaust temperature at each cylinder. The switchboard is well equipped with synchronizer, voltage regulator, kilowatt-recorder, recording voltmeter, power factor meter, watt-hour meters, and all the usual instruments. The recording volt-meter card shows virtually a perfect circle attesting to the efficacy of the voltage regulator.

Returning to a consideration of the new engine, intake air is drawn from outside the plant through an oil bath filter set about five feet above the ground. Impingement-type filters are used for the other Fultons. Exhaust gases pass from the engine header to a vertical silencer outside the plant. All the major units are arranged similarly. For starting air, there are eight interconnected tanks supplied by a 4½ in. x 5 in. motor-driven compressor. The tanks also can be filled by the compressors of the air-injection engines.

A well-equipped plant, operated efficiently and conscientiously for the benefit of the people of Conway, is earning a net operating profit of \$40,000 a year, while reducing substantially the cost of electric power to the consumer. When it is remembered that this plant twelve years ago had only 620 horsepower of installed capacity and shouldered a \$215,000.00 debt, the record of progress is impressive.

Accessories for the 1000 hp. engine include a Woodward governor, a Goulds fuel unloading pump, a Cuno fuel filter and a National meter. The lubricating oils used are RPM Delo and Conoco Dectol Medium, the oil cooler is by Ross, the oil reclaimer a Renuoil, mechanical lubricators are Manzel. The cooling water pumps are Fairbanks-Morse and Goulds, the exhaust Snubber Burgess, the air filter American Cycoil, the pyrometer Brown, the air compressor Worthington, and the switchboard and voltage regulator Westinghouse.

Quartering view of the new Fulton Diesel showing Manzel mechanical lubricator, pressure gauges, Cuno fuel oil filter, and Fulton centralized controls, extreme left. Lower right: American Cycoil air filter and Burgess exhaust Snubber for the new Diesel.





# LONG-DISTANCE DIESEL-ELECTRIC TUGBOAT

By WILL H. FULLERTON

**T**HE sister tugs, *Nancy Moran* and *Peter Moran*, recently added to the Moran Towing and Transportation Company fleet, bring the Moran roster of Diesel-driven tugs to a total of ten units. These two new Diesel-electric tugs replace other Diesel boats which were turned over to the United States Government for defense work. Two new vessels, embodying every modern advance in tugboat design, are of all-welded steel construction from designs by Tams, Incorporated, and were built by Pennsylvania Shipyards, Inc., Beaumont, Texas.

Their accommodations include extra state-rooms permitting increase of the normal complement of fifteen officers and men to twenty-three to conform with requirements for long-distance assignments, also space for thirty days' stores. There is even an owner's stateroom in the forward end of the main deckhouse, unusual accommodations for ships measuring 150

ft. long overall, 25 ft. wide, and 13 ft. 6 in. deep. Main propulsion is by a single General Motors 700 volt D.C. motor of 700 to 875 rpm. speed range, delivering 1,000 shp. at 160 to 200 rpm. through Farrel-Birmingham reduction gears. An important feature of this type of drive, aside from its smoothness and maneuverability, is that full power is delivered within the speed range. The propulsion motor receives its current from a General Motors Diesel generating set consisting of a 12 cylinder, 2 cycle, 8 1/2" bore, 10 1/2" stroke V-type Diesel engine, direct connected to a 700 volt D.C. generator, which is rated 814 kw. at 750 rpm. The separate exciter is a 24 kw. unit driven by V-belts from the main shaft. The main engines may be controlled from the pilot house, from the engine room or from the aft boat deck, the choice being controlled by a throw-over switch in the pilot house. The entire electrical control system is General Motors. There are two auxili-

ary sets made up of General Motors, 3 cylinder, 4 1/4" bore, 5" stroke, 2 cycle Diesels and 30 kw. generators with Exide Ironclad batteries floating on the line for ships lighting and motor circuits. The compactness of these power units makes for neat arrangement with ample space for working and for the essential accessory equipment. A Holcomb vacuum oil refiner is installed for continuous purification of the main engine lube oil with a 450 gallon reserve tank in the system. Other main engine room equipment includes a Worthington monoblock bilge pump of 350 gpm. at 42 lbs. capacity; Worthington 476 gpm. 100 lbs. fire pumps; and a fuel transfer pump of the same make. Starting air for the main Diesel is supplied by a Westinghouse air brake compressor. The elaborate switchboard is an Allis Chalmers product. Two American Blower 9,600 cfm. fans exhaust warm air from the engine room through ducts terminating at the after end of the deckhouse.

*The new Diesel-Electric tug was recently delivered with an identical sister ship, the "Peter Moran", to Moran Towing and Transportation Company, Inc.*

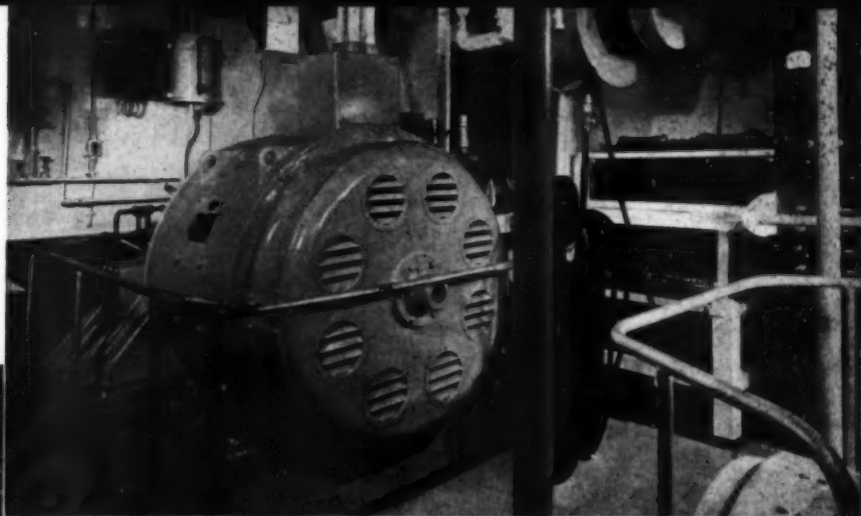


# TUGOR MORAN

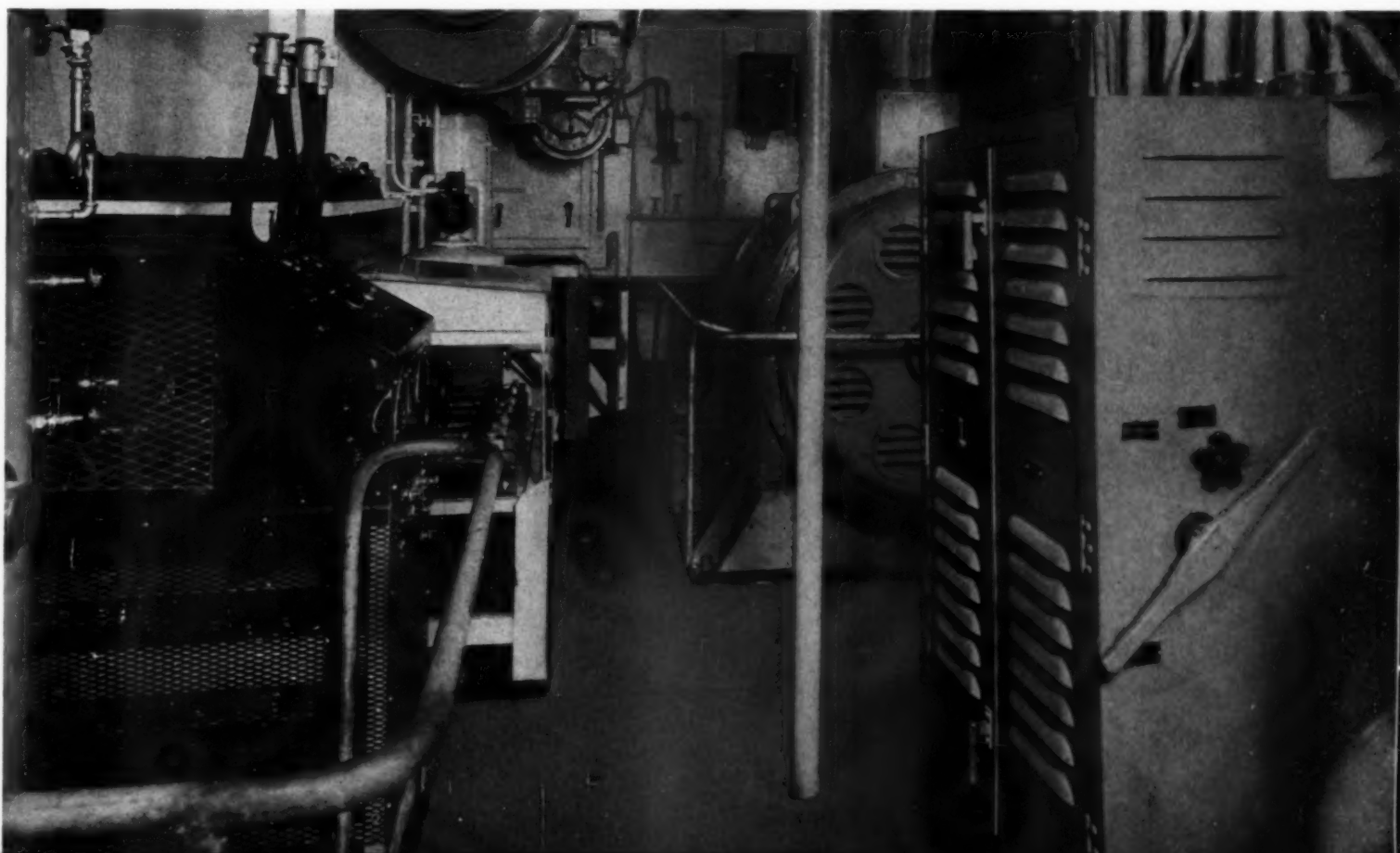
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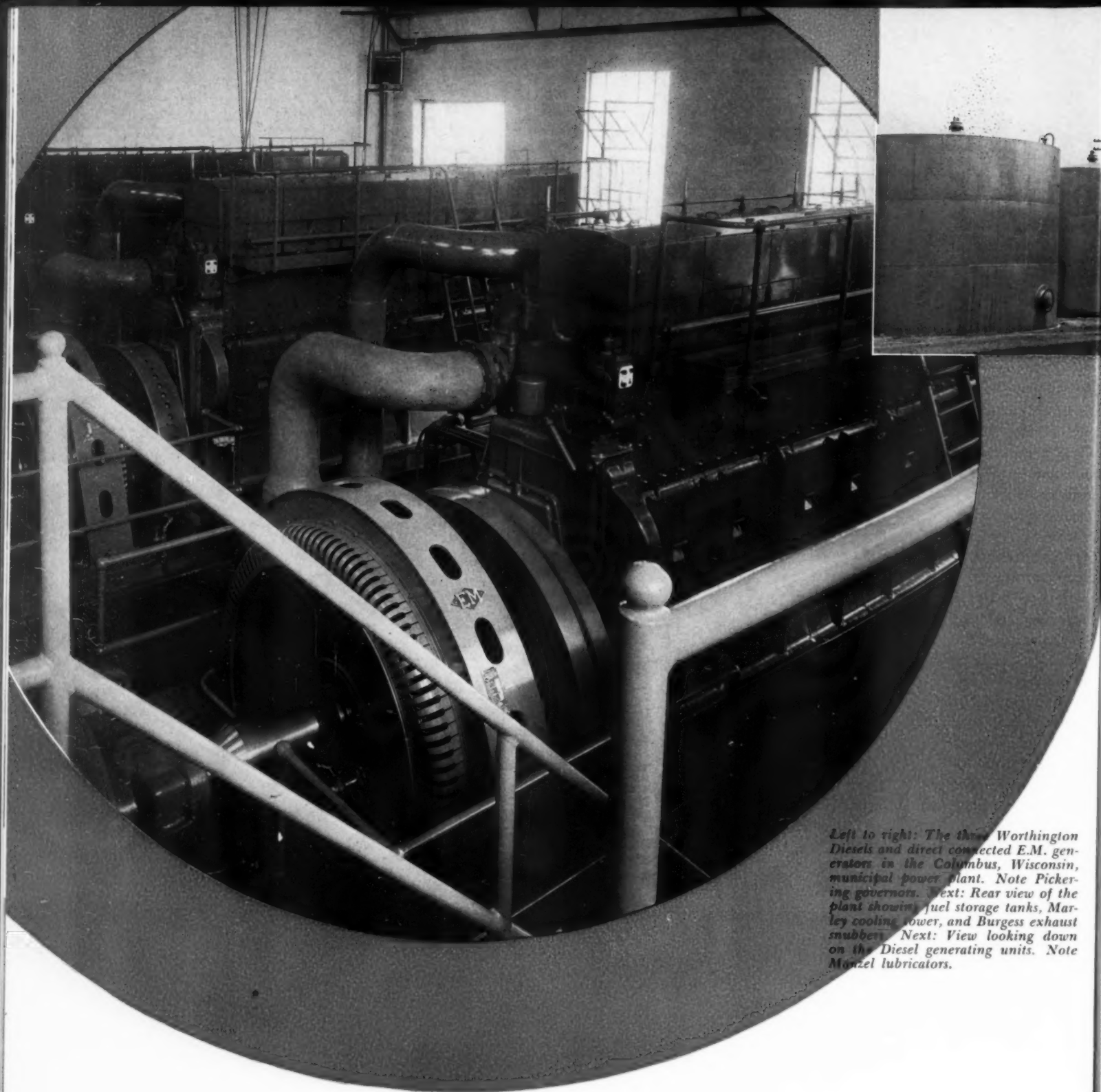
Crane supplied the plumbing throughout the vessels, and the heating boiler is a York steam unit burning Diesel oil. Officers' and crews' quarters in these modern tugs leave little to be desired in the way of comfort. Light, airy rooms are insulated, steam heated, and ventilated. Galleys are equipped with Elisha Webb & Sons oil burning ranges, monel dressers, double sinks and dish racks, and Frigidaire refrigerators. The Benson Steero Motor steering engine, operated from either the pilot house or a station on the boat deck, drives through a  $\frac{7}{8}$ " chain to a 35" radius quadrant on the rudder head above deck.

Ship-to-shore and ship-to-ship radio telephones, Bludworth directional finders, 8" Kelvin-White magnetic compasses, full CO<sub>2</sub> fire protection all contribute to the efficiency, dependability and long range ability of these new Moran Diesel-electric tugs. Texaco lube oil is used.



*Top View: The Allis-Chalmers main propulsion motor on the "Nancy Moran". Above: Starboard side of the lower engine room showing General Motors main and auxiliary Diesels, left and right, respectively. Below: Engine control stand on the "Nancy Moran".*





*Left to right: The three Worthington Diesels and direct connected E.M. generators in the Columbus, Wisconsin, municipal power plant. Note Pickering governors. Next: Rear view of the plant showing fuel storage tanks, Marley cooling tower, and Burgess exhaust scrubbers. Next: View looking down on the Diesel generating units. Note Manzel lubricators.*

## COLUMBUS, WISCONSIN

By JOHN E. HUBEL

**I**N WISCONSIN, the utility companies have been chasing electricity over a large area. No power companies and cities and towns are present is present. The utility owns the equipment to homes in town. On electricity. Where the cities are not substituting high efficiency many of the generating their or purchasing company electric power with the disclosure of purchased.

One of the utilities in Wisconsin was put. Prior to the engineers, cities. Has previously for 22 years was founded the order Pump and and with the generating officials for outstanding include on this being have to generate electric power the cost was in cash with generation.



**I**N Wisconsin, many municipalities are purchasing electric power and light from the large utility companies whose lines form a network over a large portion of the state. In such cases, no power plant is needed in the individual cities and towns so supplied, as the electric current is purchased f.o.b. city limits, the municipality owning and operating the distributing equipment necessary to furnish light and power to homes, stores, and factories in the city or town. Other cities prefer to generate their own electricity with steam as the prime mover. Where that is done, mayors and common councils are now looking into the advisability of substituting Diesel-electric plants, due to their high efficiency and lower operating costs. Today many of the cities of the state, formerly generating their own current in steam power plants or purchased electric current from the utility company network, have installed modern Diesel-electric plants of their own, and interviews with the officials of such plants have yet to disclose one that does not show great saving over purchased or steam-generated power and light.

One of the outstanding Diesel-electric installations in Wisconsin is that at Columbus which was put into operation in February, 1941. Prior to this, the city officials, with the aid of engineers, inspected similar plants in other cities. Having decided to erect a plant, having previously operated a steam generating plant for 22 years, (which was later discarded, as it was found that purchased current cost less), the order was placed with the Worthington Pump and Machinery Corp. for Diesel engines and with the Electric Machinery Mfg. Co. for the generators. While they were at it, the city officials felt that the new plant should be an outstanding one. No expense was spared to include only the best that could be purchased, this being possible because the city did not have to go into debt. When the new Diesel-electric plant was completed in February, 1941, the cost was found to be \$187,000, all paid for in cash without bond issues to burden future generations. Now the plant is a showplace, at-

tracting engineers and city officials from other cities, especially those who contemplate changing over to municipally-owned Diesel plants. Contrary to most municipal plants, the one at Columbus does not get its profits from furnishing electric current to industrial plants, as there are none to speak of in this section. There are about 2500 customers: mostly homes, stores, schools and a few commercial customers, such as creameries. The plant operates twenty-four hours a day, with one of the units taking care of the load in the day time, and two in the evening after dark. The third unit is more or less of a stand-by, but can, of course, be cut in should the peak load rise above that which can be handled by the two machines. The Diesel engines and the accessory units are as follows: Three Worthington 7 cylinder, 16" x 20", four cycle, direct injection, heavy duty, totally enclosed stationary type Diesels, each rated 875 hp. at 327 rpm., direct connected to 600 kw. Electric Machinery generators. Two starting air compressors. One unit is driven by gasoline engine, the other by motor; three duplex centrifugal type water pump units for cooling of the engine. One motor with double extended shaft and two pumps comprise each duplex unit; one rotary gear type fuel oil unloading pump for transferring fuel oil from tank cars to storage tanks; one rotary gear type fuel oil transfer pump for transferring fuel oil from storage tanks to elevated day tanks; one rotary gear type lubricating oil transfer pump for transferring lubricating oil from the engines to the purifiers and from the clean oil tanks back to the engines. The pumps and compressors were supplied by Worthington.

Each of the Diesels is fitted with a Pickering hydraulic oil relay governor for speed regulation, and a Manzel force feed lubricator. Other engine and plant accessories include a Hilco, batch type lube oil reclaiming, Cuno lube oil filter, and Ross lube oil cooler. Intakes and exhausts are handled by Burgess Snubbers and the engines are protected by Alnor pyrometers. The closed cooling system is fitted with a Ross heat exchanger, and a Marley cooling tower handles the cooling of raw water. Crane valves in water lines. The big Diesels are served by a Shaw-Box Crane. Shell lube oil is used.

The generators were designed in accordance with NEMA standards, meeting all the NEMA tests for temperature rise, dielectric tests, voltage regulations and efficiency. The full load efficiency of the generators is 94.0%;  $\frac{3}{4}$  load 93.7% and  $\frac{1}{2}$  load 93.2%.

Recent records in this plant show 13.5 kw. output per gallon of fuel oil. During August of 1941 the cost of generating current in this plant was 1.114 cents per kwh.; in September 1.15 cents, and for October 1.05 cents per kwh. It is estimated that the annual output of this Diesel-electric plant will be about 3,900,000 kwh. The cost of plant production, exclusive of interest, depreciation and taxes, is estimated at 62 cents per kwh. Total cost, including interest on investment, depreciation and taxes, about 1.11c per kwh.

Having now been in operation for nearly a year, the plant has given a good account of itself, according to Superintendent Frank Roob.

## DIESEL FISHER "JUBILEE"

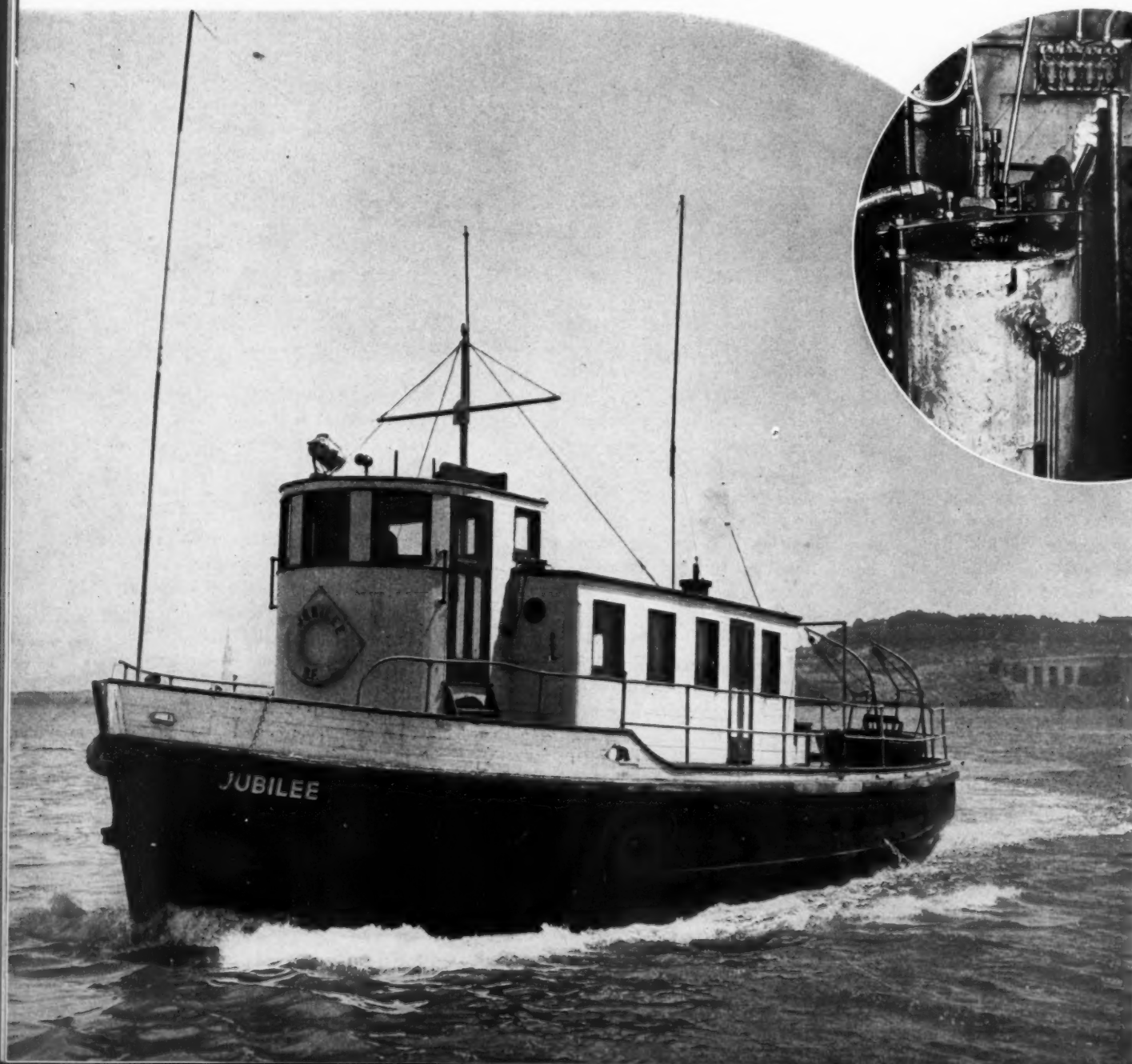
**T**HERE is a law of compensation. That's what Bob Grimes, blind San Francisco pleasure boat operator, believes and he has many reasons to substantiate this belief. When nineteen years old, a future as an automobile racing driver was his goal. This was cut short when the car he was tuning up crashed into a fence and left him totally blind. Undaunted by this catastrophe, and by the further fact that hospital and doctors bills had left him penniless, Grimes scraped together sufficient funds to purchase an ancient fishing boat he discovered along San Francisco yacht harbor. The boat was hopelessly in need of repair, but here

came the first evidence of the law of compensation. Grimes was able to repair the boat, even to completely rebuilding the motor. No outside help was needed, and by the laborious process of feeling his way soon had it in a seaworthy condition. The sixty-two foot *Jubilee*, with an Atlas Diesel engine, was purchased in 1937. Grimes placed the Atlas Diesel in excellent running condition, and made all necessary repairs on the boat itself, opened a tiny office and ran a classified advertisement for fishing customers. The business developed rapidly for, in addition to Grime's uncanny ability to make mechanical and other repairs, his intuition told

him where the best fishing grounds were located. Two years later, the forty-two foot *Lucky Strike* was purchased. This boat is also powered by an Atlas Diesel engine. The boats are valued at \$15,000, but no value can be placed on the business, for every day the two vessels leave pier 3½, San Francisco, with a paying load of fishermen. Today, the former penniless blind automobile racing driver owns two excellent boats, has a thriving business, is a licensed radio telephone operator, an excellent plumber, and takes a healthy, active interest in life.

*This 62 ft. West Coast party fisher is powered with an Atlas Diesel.*

*Totally blind, Bob Grimes keeps both boat and engine in repair, and unfailingly finds best fishing grounds for his customers.*



## Germans Employing New Type of Seaplane

Berlin, Dec. 5 (A. P.).—A new three-engined reconnaissance seaplane which already is in production was pictured in the German press tonight.

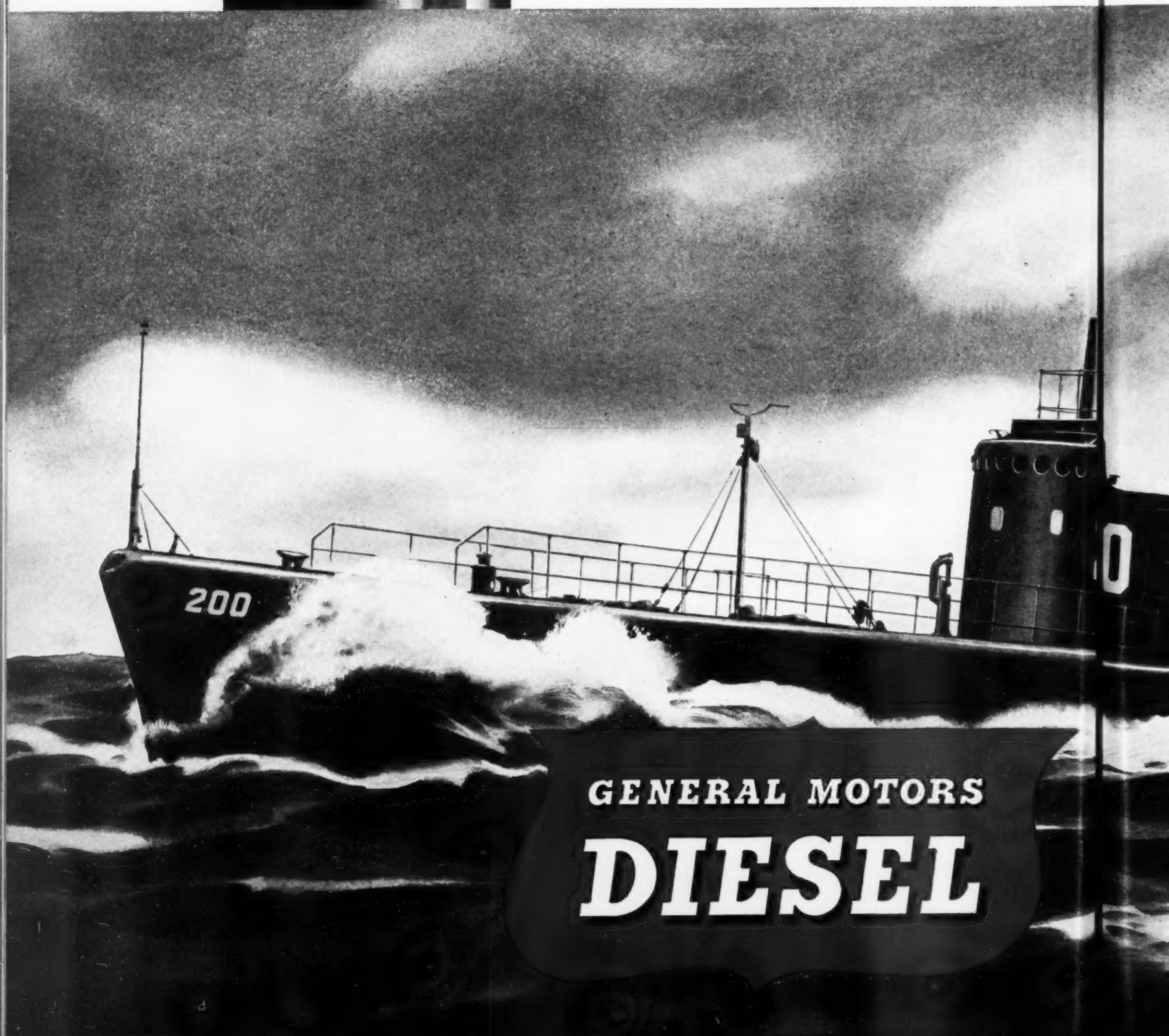
The plane has a light, double-fin fuselage and one of its three *Junkers Diesel* motors is directly above the glassy, boat-shaped cabin. Its body construction permits defense from all sides.

DIESEL PROGRESS pioneered the use of Diesel Engines in aeroplanes back in November, 1935, and has been fostering this idea ever since.





# ***UNDERS***



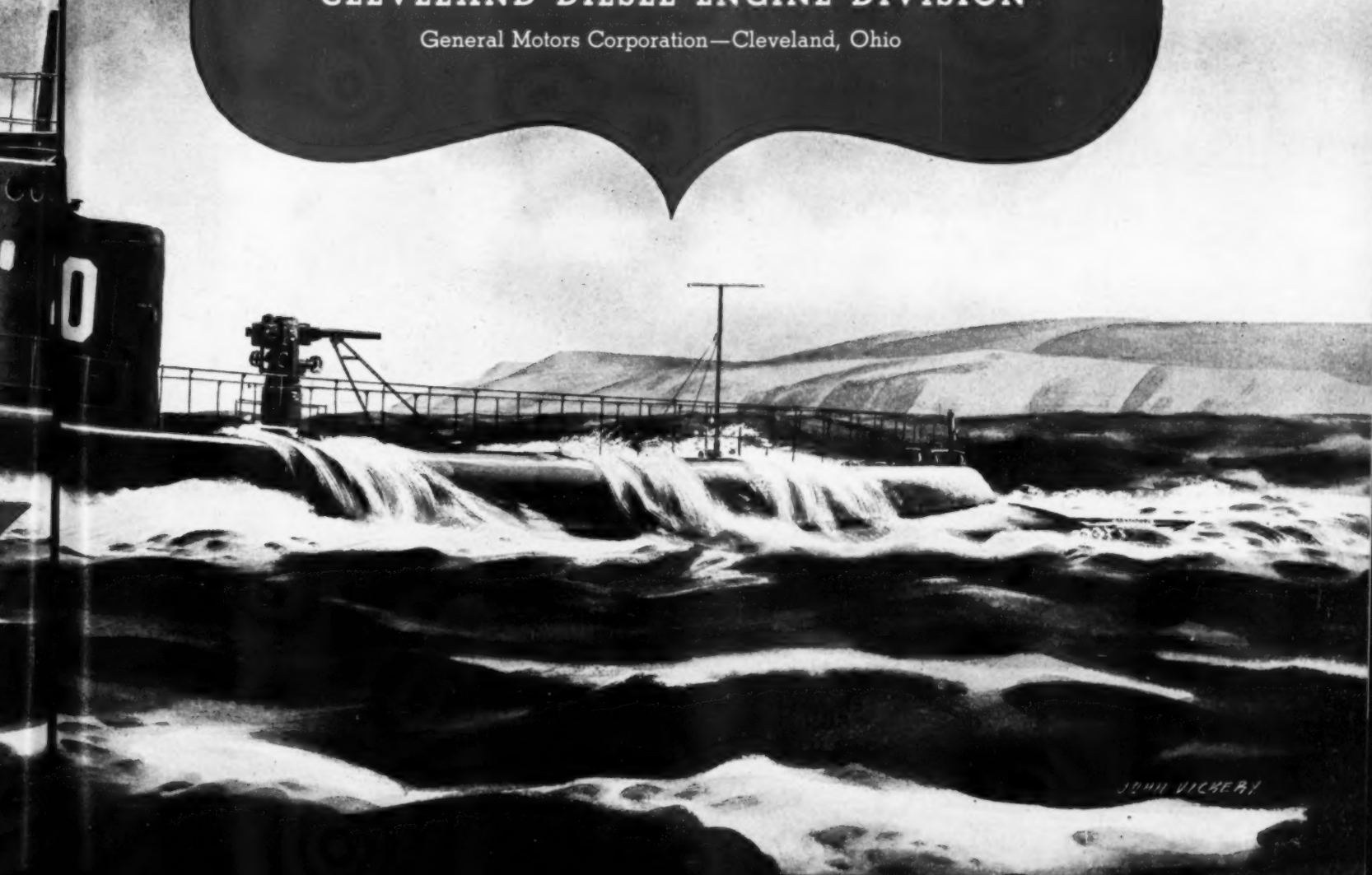
GENERAL MOTORS  
**DIESEL**

# UNDERSEA POWER

As the Navy builds to make its underseas fleet the most formidable in the world, each new submarine must have the most highly coordinated, efficient and flexible propulsion system available. Such is the Diesel-Electric Drive as developed by General Motors.

**CLEVELAND DIESEL ENGINE DIVISION**

General Motors Corporation—Cleveland, Ohio



JOHN VICKERY





**G**ARY, Indiana, is justly proud of its new sewage treatment plant which is modern, economical, and efficient in every respect. It employs the most modern methods and equipment in treating and handling the sewage, and it uses the most economical power available—gas engines using sewage gas for fuel!

Gary, the steel center of the Mid-West, is a city of 130,000 population, and is located on the shore of Lake Michigan about 25 miles southeast of Chicago. Adjoining Gary are a number of smaller cities whose chief industries are petroleum refining, cement manufacturing, and the manufacturing of iron and steel products. Thus, Gary is the nucleus of an important industrial area of over 300,000 population.

In 1938, the city decided to expand and remodel its sewage system, built in 1906, which was both obsolete and inadequate to meet present day requirements. Application was made to the Public Works Administration for a grant to pay part of the costs of a \$4,600,000 public improvements program. This program included a new sewage treatment plant and extensions to the sewer system totalling approximately \$2,000,000. The new plant was completed and placed in operation in August, 1940. This thumb-nail history of the plant is sufficient to indicate that the plant was so recently planned and built that it would logically include the most modern methods and equipment used in a plant of this type.

Gas engines have proven for several years that they are the cheapest source of power for sewage treating plants; hence, it was perfectly logical that a modern plant constructed during 1939 and 1940 would include gas engines for power. The sewage treatment process produces a by-product gas which is suitable fuel for internal combustion engines. Further, the rapid decomposition and treatment of the sewage is aided by keeping the sewage warm during certain steps in the process. The problem seems to be reduced to this—Required: power for

pumping and blowing, and heat to warm the sewage. Available: a gaseous fuel, suitable for heat and power, costing nothing because it is a by-product of the process. Solution: gas engines for power, and heat recovery from the engines to warm the sewage. Sounds simple enough, doesn't it? Well, it is both simple and economical as proven by nearly 300 such installations in the last twelve years.

There are two complete installations of gas engines in the Gary plant: one for pumping the raw sewage, and the other for blowing air through the sewage in the aeration basins. Each group of these engines will be described separately, as each constitutes a separate installation, performing different duties, and operating independently of the other.

The pump room is located about twelve feet below grade in the east wing of the main building, and contains all of the raw sewage pumping equipment. There are three 175 hp., 5 cylinder, 600 rpm. Worthington gas engines, each connected through an intermediate shaft and flexible couplings to a 24" Worthington Mixflo centrifugal pump. Each engine and the upper portion of its foundation is mounted on Hussman vibration dampeners and is completely isolated from the building structure and floor. The driven equipment, the pumps, are mounted rigidly on concrete foundations as it was not considered expedient to attempt to use the large size flexible piping which would be required if the pumps were on a movable foundation. The intermediate shafts and flexible couplings are required to permit freedom of engine movement while driving the rigidly mounted pumps.

Each engine is equipped with a Bendix impulse-type magneto for ignition. Air for the engines is taken directly from the room and is drawn through an air cleaner before it enters the mixing valve. The exhaust gases are discharged into a water-cooled exhaust manifold from which they are passed through an exhaust

water-heater and an exhaust silencer before being released to the atmosphere.

An instrument panel located on the operating side of each engine includes an exhaust gas pyrometer, a lubricating oil pressure gauge, a dial type thermometer for jacket water outlet temperatures, and a tachometer for indicating



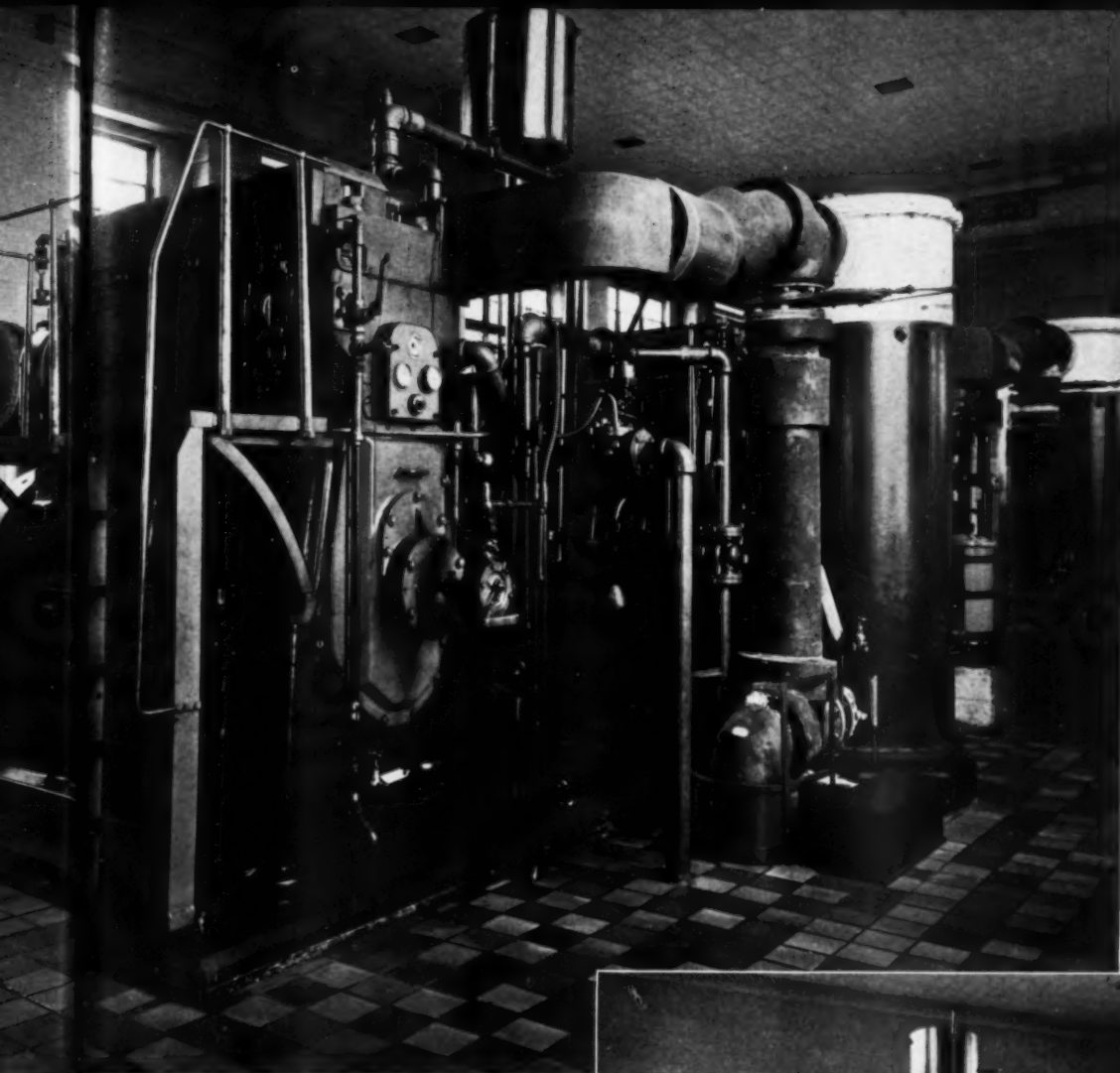
## GARYND

### MODERN SEWAGE PLACES GARY

By DOUGLAS SHEARING

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*Extreme left: The plant that "Steel" built, the Gary, Indiana, Sewage Treatment Plant. Center: The two Cooper-Bessemer gas engines driving Roots-Connersville blowers, each unit being isolated on Hussman spring bases. Sims exhaust water heaters are seen, right, with Honan-Crane lube oil purifier between. Below: General blower room view showing Sims horizontal heat exchanger and Elliott motor generator set.*

## INDIANA

### E PLACES GAS ENGINES

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the engine speed. The engines are equipped with variable speed governors capable of controlling the engines over wide ranges of speed to meet the varying pumping requirements. At the full engine speed of 600 rpm., the pumps have a capacity of 13,900 gpm., or 20,000,000 gallons per day against a total head of 35 feet. The speed of the pump is varied according to

the quantity of incoming sewage to be handled. Each engine is equipped with protective devices arranged to shut the engine down in case of high jacket water temperature or failure of the lubricating oil pressure. The pump room is equipped with a 7½-ton traveling crane which is of sufficient capacity to lift the largest part of any piece of equipment in the room. The

blower room occupies the center section of the main building, and houses two 6-cylinder, 300 hp., 400 rpm. Cooper-Bessemer gas engines. Each of these engines is direct connected to a 24" x 26½" Roots-Connersville rotary type blower delivering 7,000 cubic feet of air per minute at eight pounds gauge pressure. The blower engine installations differ from the

pumping engines in that both the engine and the driven unit, in this case the blower, are mounted on a common foundation which is isolated from the building by Korfund Vibro-Isolators.

Each of the blower-room engines is equipped with an American Bosch magneto and a Pickering variable speed governor. Air for each engine is taken directly from the engine room and through an air cleaner before entering the mixing valve. The exhaust gas is discharged into a water-cooled manifold and is passed through an exhaust water-heater and an exhaust muffler before being discharged to the atmosphere. An exhaust pyrometer, mounted on the blower room wall, has sufficient switch points to provide for each cylinder on both blower room engines. The traveling crane in the blower room has a capacity of fifteen tons. An instrument panel on the operating end of each engine includes a lubricating oil pressure gauge, a dial type thermometer for the engine jacket water, a tachometer to indicate the engine speed, and the ignition switch. Protective devices on each engine include water temperature and oil pressure alarms, and an electrically-operated valve arranged to supply city water to the engine jackets in case of failure of the circulating pumps.

In many essential features, both groups of engines are quite similar in arrangement and operation. All engines in the plant use the same sewer gas for fuel. The gas is a by-product of the sewage treating process, and contains 60-65% of methane and fractional percentages of hydrogen, carbon monoxide, and hydrogen sulfide. The latter constituent is rather objectionable and injurious to the engines if present in appreciable quantities, but is removed from the gas by treatment. The gas is fairly uniform in composition, and its heat value ranges from 640 to 700 Btu. per cu. ft.

The sewer gas is formed in the secondary digesters and is collected and stored in floating gas holders which also serve as covers for the digesters. There are three of these gas holders, each having a capacity of 60,000 cubic feet, with a combined capacity of 180,000 cubic feet. As the plant requirements range from 150,000 to 165,000 cubic feet of gas per day under normal conditions, the gas storage capacity is in excess of 24 hours' supply. Under normal conditions, the by-product sewer gas produced by the treatment is sufficient to supply the power and heat required by the plant. During prolonged rainy weather, however, there is more water to be handled, and less gas forming ma-

terial in the sewage. Under these conditions, it may become necessary to use the electric driven pumps and blowers to augment the power supplied by the engines.

A necessary condition for rapid decomposition and treatment of the sewage is warmth, and the primary digesters are maintained at temperatures of 85 to 90° F. The heat required to bring the sewage up to this temperature is obtained from a heat recovery system on the gas engines. This heat recovery system consists of two closed water circuits besides the sewage to which the heat is ultimately lost. A brief description of the heat recovery system follows:

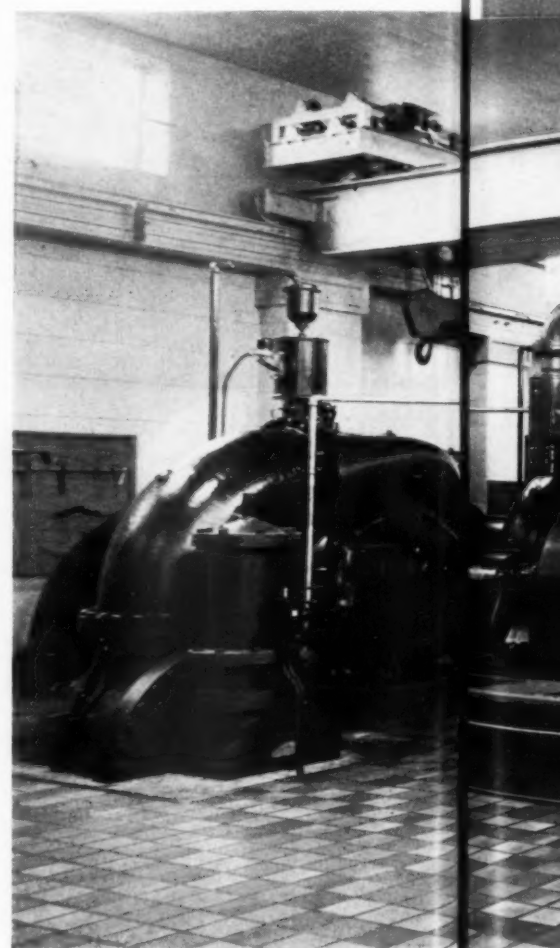
The engine jacket water circulates through the engine jackets and the water-cooled exhaust manifold from both of which heat is received by the water. The heat, thus taken from the engine, is transferred to the digester circuit in a double flow heat exchanger. Water from the digester heating circuit acquires the jacket water heat before passing into an exhaust boiler or water-heater where additional heat is absorbed from the exhaust gases of the engine. An idea of the effectiveness of the heat transfer in the exhaust boiler is indicated by the fact that the exhaust gas temperature is reduced 1040° F. to 270° F. under normal conditions.

Each of the five engines in the plant is equipped with a heat exchanger for the jacket water and an exhaust gas boiler on hot water operation. Thus, each engine has its own individual cylinder jacket circuit, but the digester heating water is a common circuit receiving heat from all heat exchangers and exhaust water heaters. The digester heating water circuit also is used to heat the offices and various buildings. Typical water temperatures in the various circuits are:

Jacket water inlet, Worthington engines, 140° F.; jacket water outlet, Worthington engines, 148° F.; jacket water inlet, Cooper-Bessemer engines, 136° F.; jacket water outlet, Cooper-Bessemer engines, 146° F.; digester circuit, inlet to heat exchanger, 116° F.; directer circuit, inlet to exhaust heater, 130° F.; digester circuit, outlet from the exhaust heater, 150° F. The lubricating oil coolers are supplied with cooling water from the digester circuit which enters the coolers at 116° F. before being passed on into the heat exchanger.

During the first few months of operation the plant was not equipped with lubricating oil filters, and averaged 2,000 rated horsepower hours per gallon of lubricating oil. Later,

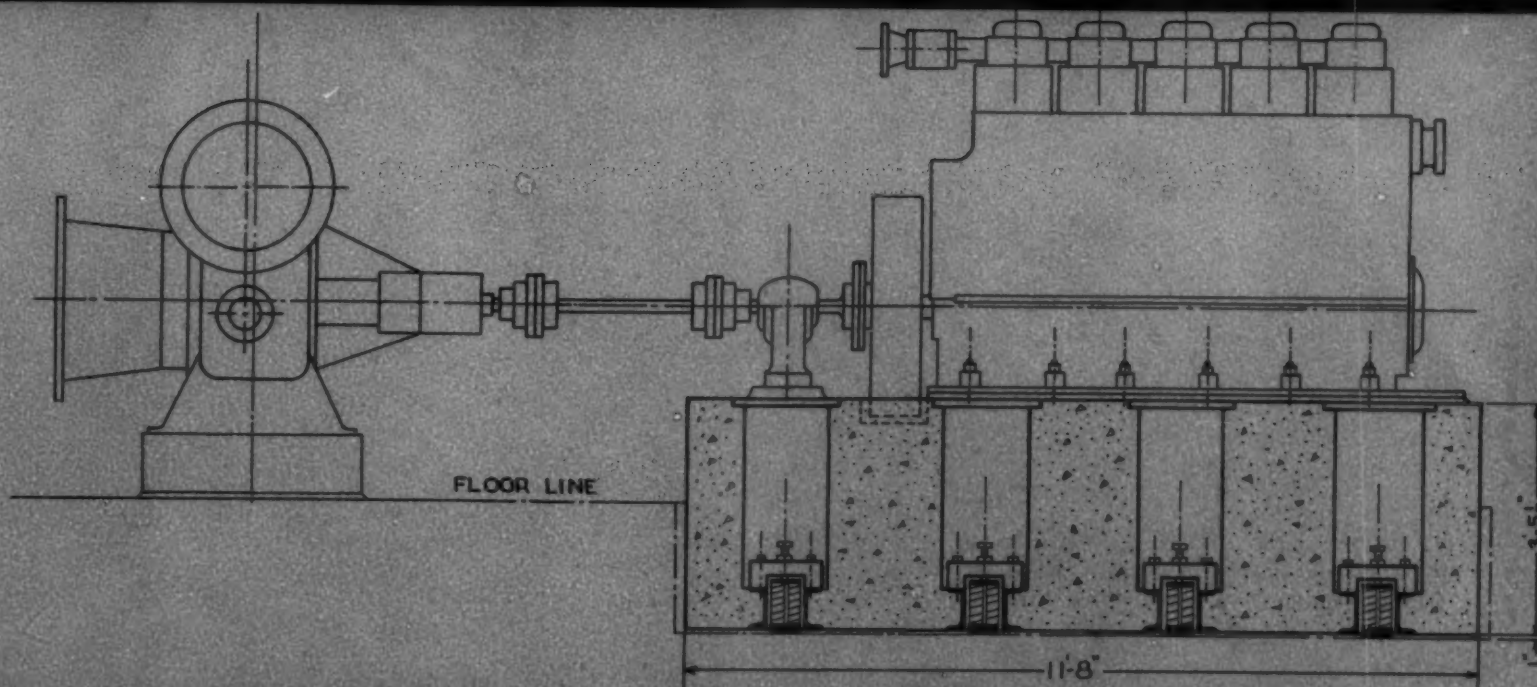
activated clay type oil filters were installed for the primary purpose of keeping the oil and engines clean. Operating figures for recent months show that the lubricating oil consumption is now one gallon for each 4,000 rated horsepower hours of operation. The lubricating oil is heated to 150° F. before filtering, and is cooled before returning to the crankcase. Both groups of engines use the same brand of lubricating oil; however, the Worthington engines use an SAE 30 viscosity grade while the Cooper-Bessemer engines use an SAE 40 viscosity grade. A conventional air starting system provides air at 250 pounds pressure, and is used by all five of the engines.



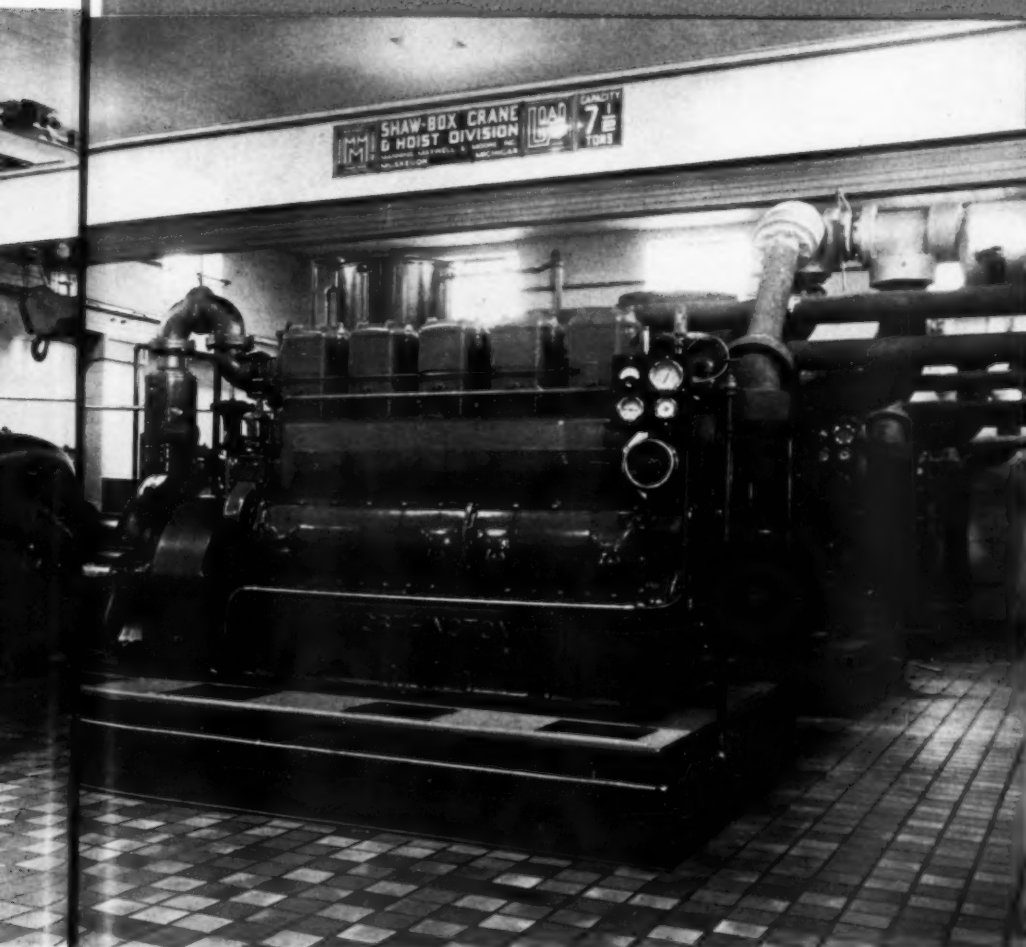
The sewage plant is equipped with a complete chemical laboratory for testing and controlling the sewage treatment processes and the sewage gas. The facilities of the laboratory also are used in keeping a constant check on the condition of the lubricating oil in the engines. After

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*Diagram of the Korfund Vibro Isolators on which the Worthington engines are mounted.*



*Three Worthington gas engines direct connected to Worthington pumps. Note Vortex air cleaner under crane, Alnor pyrometer on gauge panel, and Burgess exhaust Snubber, upper right.*

fifteen months of operation, the engines are in good condition and the only maintenance costs were a few dollars for new spark plugs. Valves, pistons, rings and other moving parts are in good condition; and, the plant management feels that close supervision and checking of the

lubricating oil are largely responsible for the good operating records.

Electric driven equipment is installed for stand-by and flood period service. The electric equipment has not been required at any time due to

engine failure, although it has been used during rainy weather when there was not sufficient gas available to pump all of the water from the storm sewers. The monthly stand-by charge of the electric utilities company is \$410.00. An additional stand-by service consists of a gas service connection which can provide city gas for engine operation should electric power fail. The plant management estimates the savings from using the by-product gas instead of purchased gas ranges from \$1,500 to \$1,800 per month. When asked what the savings would be if compared to purchased electric power, the plant superintendent replied, "You can't figure it that way. We would still need the gas to heat the sewage!"

Essential auxiliaries in the plant include: traveling cranes by Shaw Box Crane Division of Manning, Maxwell and Moore; oil refiners by Honan-Crane Corp.; lubricating oil by Shell Oil Co.; heat exchangers and exhaust type water heaters by The Sims Co.; exhaust Snubbers by Burgess Battery Co.; air filters by Vortex Manufacturing Co.; exhaust pyrometers by Illinois Testing Laboratories; starting air compressor and cooling water pumps by Worthington Pump and Machinery Corp.; and pressure gauges by U. S. Gauge Co.; Governors by Pickering; magnetos on the Worthington engines are Scintilla and on the C.B. engines are American Bosch; safety controls on these engines respectively are Mercoid and Detroit Lubricator.





*Last of five identical Diesel tugs delivered to the Army this year.*

## MORE DIESEL TUGS FOR THE ARMY

By WARREN GLEASON

**A**S the "C" and the "EC" ships and the tankers slide off the concrete ways in the big-ship establishments and as the colorful tanks and bombers roar off the assembly lines, the Army is steadily and quietly acquiring and building the units necessary for equipping a vast and perfectly balanced force. Efficient transportation, not only of men but of materials, is just as essential in winning a modern war as is the front-line spearhead.

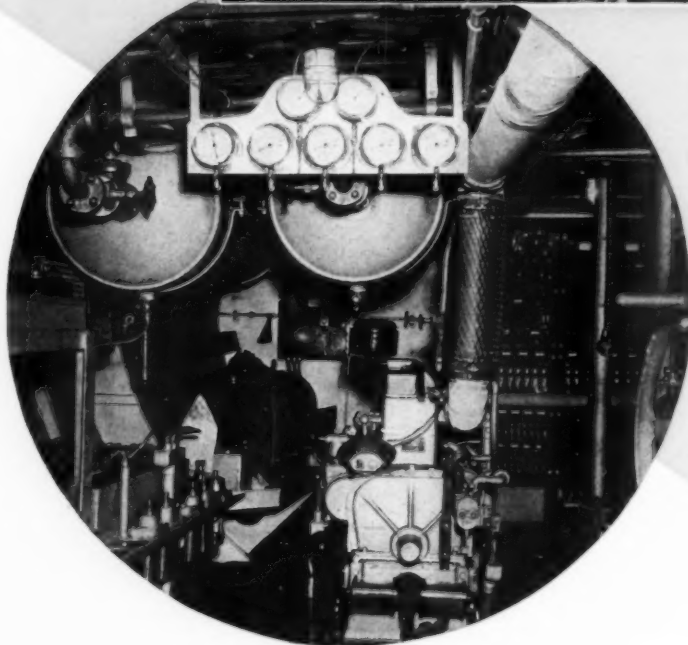
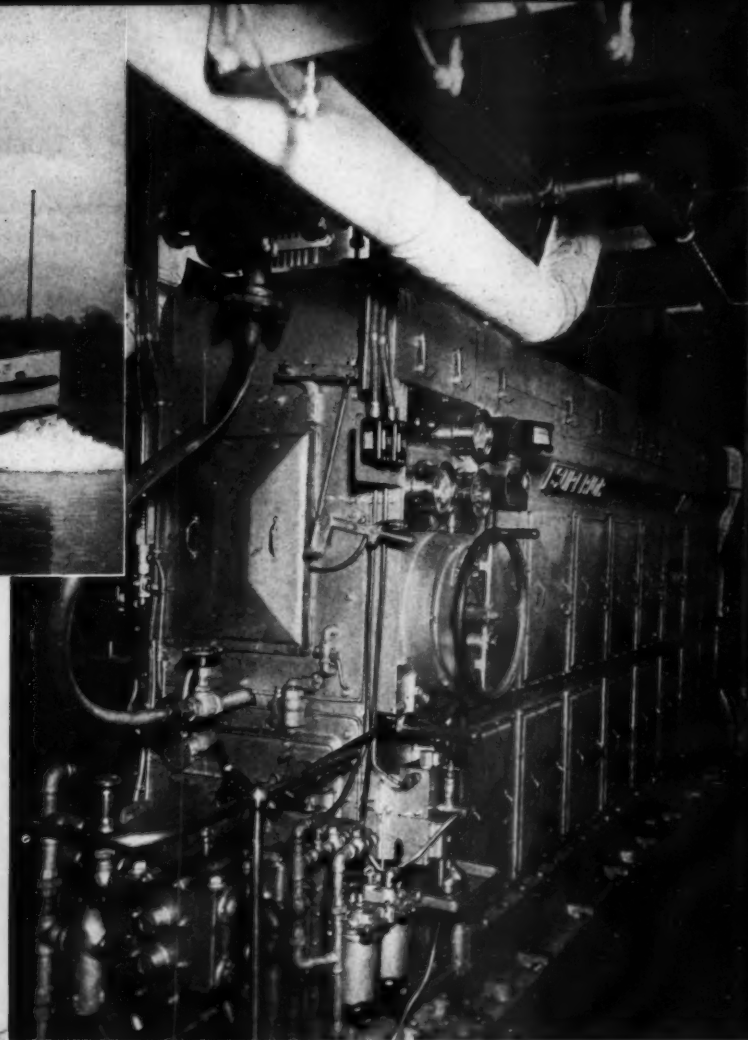
In the scheme of military transportation, tugboats are inevitable: Tugs for berthing supply ships and transports; tugs for long hauls of laden barges; tugs for tending dredges, pile-drivers, and derricks for port improvements and construction of new army bases. Tugs are the indispensable gentlemen with the heavy wallop in a pinch, and our modern army's fleet of tugboats alone would dwarf the navy of many a smaller country.

A number of notable additions to the Army's tugboat fleet have been constructed at the yards of the Equitable Equipment Company,

Inc., of New Orleans. The first boats of this group, the *Col. Ernest H. Agnew* and the *Brig. Gen. John B. Bellinger*, were believed some months ago to represent the last word in today's tug construction. As others, such as the *Col. Richard T. Ellis*, the *Col. William G. Gambrill*, and lastly the *Maj. George H. Harrell*, have come down the ways, have had their

trials, and have been accepted by the Quartermaster Corps, it is evident that the "last word" only applies to the vessel under immediate construction, for each tug has been appreciably improved over its predecessor.

All the foregoing craft have been of the same dimensions: 82' overall length, 23' beam and



*A Superior, 560 hp., 400 rpm. Diesel, here illustrated, is installed on each of the five tugs for propulsion. Note Alnor pyrometer, center.*

*Seen, lower center, is one of the pair of Superior Auxiliary Diesels.*

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The Buda Diesel which powers the tug "Maj. John A. King," ex "Equity II."



This tug was taken over by the Quartermaster Corps and renamed "Maj. John A. King."

maximum draft of 8' 6". Power, is identical in all, the engine specified being the Superior Diesel of eight cylinders, 12½" by 15" and developing 560 hp. at 400 rpm.

Not only has hull and control and general arrangement been bettered but, according to John Pottharst, president of Mechanical Equipment Corporation of New Orleans, Superior Distributors, the Diesel itself has been improved. The engines of the *Ellis*, *Gambrill* and *Harrell* have been equipped with full force feed lubrication to every moving part, even including rocker arms. Engine accessories and engine room machinery have been added and changed for the better; a revolution counter has been added to the Diesel, registering a record count of every revolution made by the engine.

The basic plans of these powerful tugs were prepared by the naval architects of the Equitable Equipment Company. Construction has been under the supervision of Lt. Col. W. W. Moore of the Quartermaster Corps who has

also taken an active part in matters pertaining to design, equipment and performance.

Previous tugs of this series have been described in detail. Like all the foregoing, the new *Maj. George H. Harrell* has for auxiliary duty a pair of Superior Diesels, each driving 25 kw. Crocker-Wheeler generators. An Alnor pyrometer is fitted to the main Diesel.

While maintaining speed in the construction of heavy tugs and barges for the Army, the Equitable yards have been busy with stock construction with the idea of maintaining and training a larger force of skilled workmen. A number of these stock jobs have also been taken over while under construction and have been completed for the Quartermaster Corps. Among these is the small tug *Equity II*, now in the Quartermaster service under the new name of *Maj. John A. King*.

The *King* is 55' 3" in length, with a beam of 17' 3", and a draft of 4' 6". Like the larger vessels, this one is a fine all-steel, arc-welded

job and of heavy construction. The power plant is a Buda Diesel, 6 cylinders, 6¾" by 8¾", developing 154 hp. at 800 rpm.; a conservative rating made by the Buda Company following its policy of adapting the BMEP to the hull and the job. Maximum laboratory performance of this engine shows 248 hp. at 1100 rpm. The propeller is a 46" diameter by 33" pitch Columbian Bronze which is turned at 400 rpm. through a 2 to 1 reduction gear. Starting of the engine is electrical, and heat exchanger is standard equipment. All engine controls are brought to the pilot house and, if necessary, the *Maj. John A. King* may be operated by one man.

Crew's quarters are above decks: Five men can be accommodated and quarters are insulated with Masonite panelling. The galley is below deck, amply ventilated and insulated, and is equipped with a 2½' WebbperfectoN oil-burning range and electric refrigeration. The tug is approved by the Bureau of Marine Inspection and Navigation, which speaks volumes for its construction. Such approval is not usually awarded to vessels of this small size.

And more tugs are on the way. Shortly to be launched by Equitable at Madisonville, Louisiana, is a 102' tug for the Quartermaster Corps, which will be powered with a Superior Diesel of 1000 hp. Just delivered to the Army, also, were two Diesel-equipped barges for gasoline transport. These barges, designated by Equitable as Hulls No. 142 and No. 143, are of approved arc-welded type 120' overall, 33' beam with a depth of 10' 6"; capacity is 700 tons at 9' draft; in gallons, 220,000 is the total. Each barge is equipped with a Buda Diesel, driving a Viking model ZP 8" pump for handling cargo.

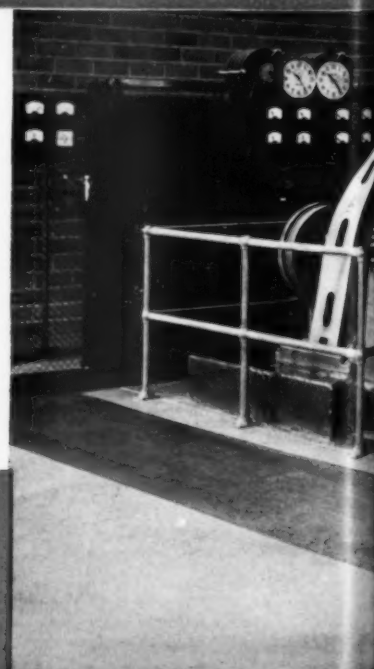
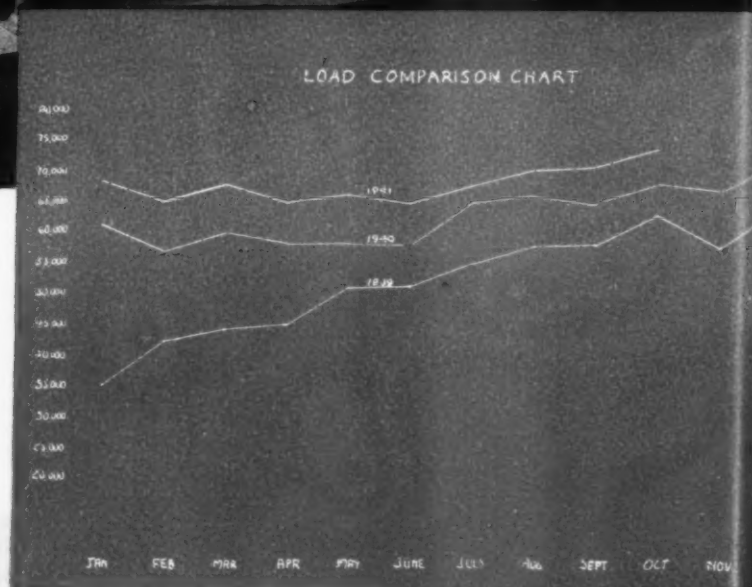




↑ The two Worthington, 300 hp. Diesel engines and E.M. generators in the Truman, Minnesota, power plant.

→ Chart showing the load increases on the Truman plant during the last three years.

↓ Exterior view of the very neat and modern municipally-owned generating plant at Truman.



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# TRUMAN, MINNESOTA

By J. O. STOLEE\*

**T**RUMAN, a village of about 1,000 population, is located in the center of some of the best farming territory in Southern Minnesota.

Until January 1, 1939, when Truman began generating its own power, it was served by a well-known power company. During the last few years of service from the power company, the service interruptions were so numerous that the consumers suffered heavy losses and much inconvenience. In 1938, after considerable debate, the question of building a municipal generating plant was brought to a vote of the people. The vote carried by a large majority, 359 to 125. In September, 1938, the village began construction of a generating plant and distribution system.

On January 1, 1939, the municipal plant began generating and selling electrical energy in competition with the power company, whose franchise was not to expire until April, 1940. By

\*Superintendent of the Truman, Minnesota, Power Plant.

July 15, 1939, 90% of the electrical consumers in Truman were connected with the municipal plant. In October, 1939, the power company asked all consumers, still on their lines, to connect over to the municipal plant as it desired to discontinue furnishing electrical service in the village of Truman, Minnesota.

The engines are Worthington four cycle, 300 hp., six cylinder, mechanical injection Diesels, turning at 400 rpm. with 10 $\frac{3}{4}$ " x 14 $\frac{1}{4}$ " cylinders. The Diesels are direct connected to 2,400 volt, 60 cycle, 200 kw. Electric Machinery alternators with belt-driven exciters. The speed of the engine is controlled by Woodward isochronous governors. The engines are equipped with Maxim exhaust silencers and American Air Filters. An alarm system is connected with each engine to warn of low oil pressure, excessive water temperature, low water pressure, and low water level in the cooling system.

The switchboard has eight panels, including two blank panels to be used in case another

engine is installed or another circuit added. All switches and instruments are General Electric products. The voltage regulators are of the General Electric G.D.A. direct acting type. The auxiliary equipment is located in the basement. A Worthington dual drive V-type air-compressor furnishes the starting air. A Worthington gear pump is used to bring fuel from the 15,000 gallon underground storage tank to the day tanks which are located in the main engine room. Three Worthington Mono-Bloc pumps are provided for the soft and raw water circuits. One pump can be used interchangeably on either circuit in case of failure of one of the other pumps.

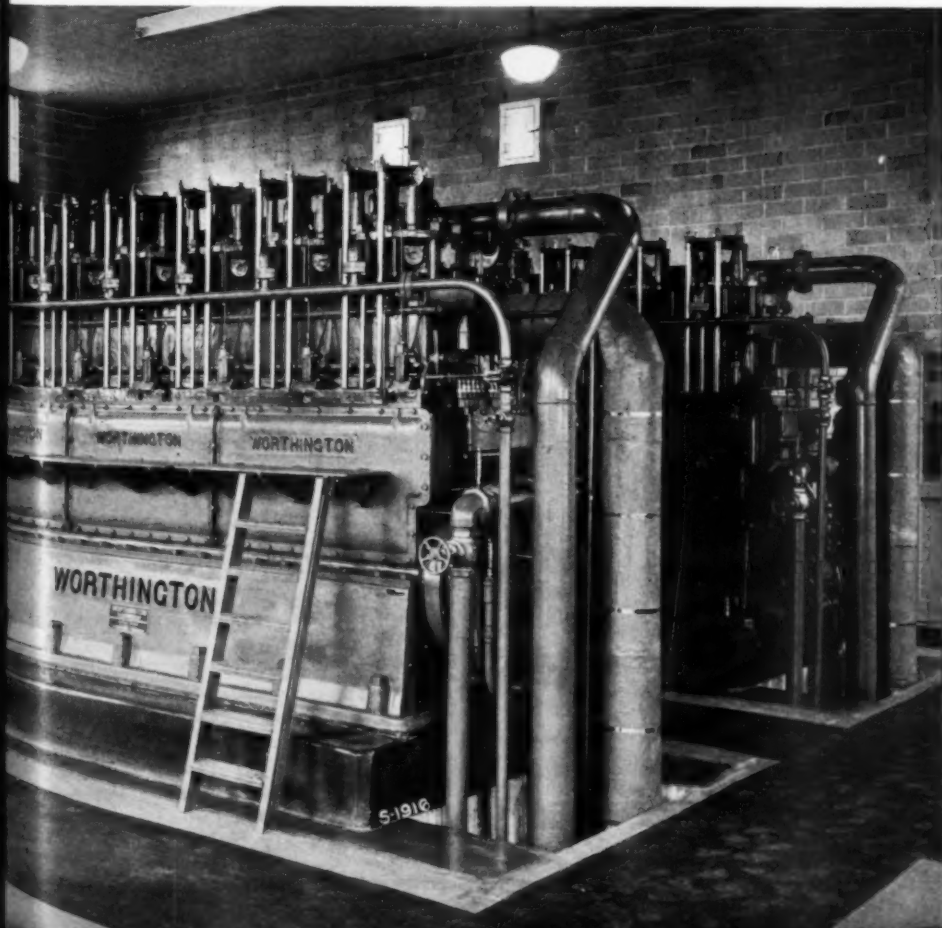
The lubricating oil system consists of a sump tank into which oil is drained from the engines. The oil is pumped back to the engines by a small gear pump. A Honan-Crane refiner is used for cleaning oil on the continuous by-pass method. The engines are lubricated with Socony-Vacuum Oil Company, Inc., products.

A closed cooling system is used, employing a Marley natural draft cooling tower, with the heat exchanger located in the base of the cooling tower. The water system piping is so arranged that city water can be circulated through engines or overheat exchangers in an emergency. The plant building, besides housing generating and auxiliary equipment, provides space for an office, public library, tool-room and store room. All rooms, except the engine room, are heated from waste heat recovered from the engine cooling water which is passed through Modine unit heaters. Exhaust heat, used to heat the engine room, is obtained by circulating air around exhaust silencers and returning it to the engine room.

The project was financed with \$50,000 in general obligation bonds and \$50,888 in revenue certificates. The total amount included all engineering and legal fees.

The system is managed by a Utility Board, consisting of three men appointed by the Village Council. This Board also manages the municipal water department.

In this close-up of the Diesels note Woodward governor and Manzel lubricators.





## DIESEL TUGS FOR HIS MAJESTY, THE KING

By WARREN GLEASON



**I**T'S a long way from the Mississippi River to Canada; that is, when you go the long way from the mouth of the river, across the Gulf around the tip of Florida, and then up the Atlantic to the St. Lawrence River. Quite a trip, in fact, especially for a driveway delivery. Such a trip argues not only need on the part of the buyer, but also great confidence in the boat he has bought; implying a high rating, therefore, for the designing and building organization.

Two Diesel tugboats have recently made this voyage, being transferred by the Lester F. Alexander Company of New Orleans to His Majesty, the King, in Right of Canada represented by the Minister of Munitions and Supply, Ottawa, Ontario, Canada. Both boats, the *North Wind* and the *North Star*, were designed by the Alexander firm and built at their yards on the Industrial Canal at New Orleans. The fact that neither boat is large,—one being only 80' overall and the other less than 70',—emphasizes the buyer's belief in the ability of the boats and their power plants.

The Lester F. Alexander Company points out that primarily the company is in the contracting business, concerned with rivers and harbors improvements. Such work requires much equipment in the line of derricks, dredges, barges and tugs. Consequently the firm operates its own building yards, designing and completing its own equipment for efficient, long and economical service. It is true that the firm sells many barges and tugboats; however, practically every keel ever laid down has been designed especially for the firm's own use and as Lester F. Alexander himself is a veteran of forty years' experience in the tugboat and marine contracting field, he has the reputation of knowing what a good tug ought to have in its make-up. Buyers, therefore, keep appearing for Alexander tugs, and Colonel Alexander has to keep on building them in order to be sure of ever having a tugboat he can use himself.

The *North Star*, one of the latest jobs completed by the Alexander yards, is 68' overall, with a 17' beam and a depth of 8'. Very trim in appearance with beautifully proportioned superstructures, she is likewise of stout construction. Keel and stem bars are of 8" by 1 1/4" steel, the stern post 10" by 1 1/4". Garboard strake and bow plating is of 3/8" thickness, other hull plating 5/16", tank and bulkhead plating 1/4". Frames, cut from steel plate 1/2" thick, are 4 1/2" in depth and spaced on 18" centers. Decking is of 1/4" checkered plating on deck beams of angles 3 1/2" by 3 1/2" by 5/16"



also on 18" centers. All of which produces a sturdy hull, able to go about anywhere so long as the fuel lasts.

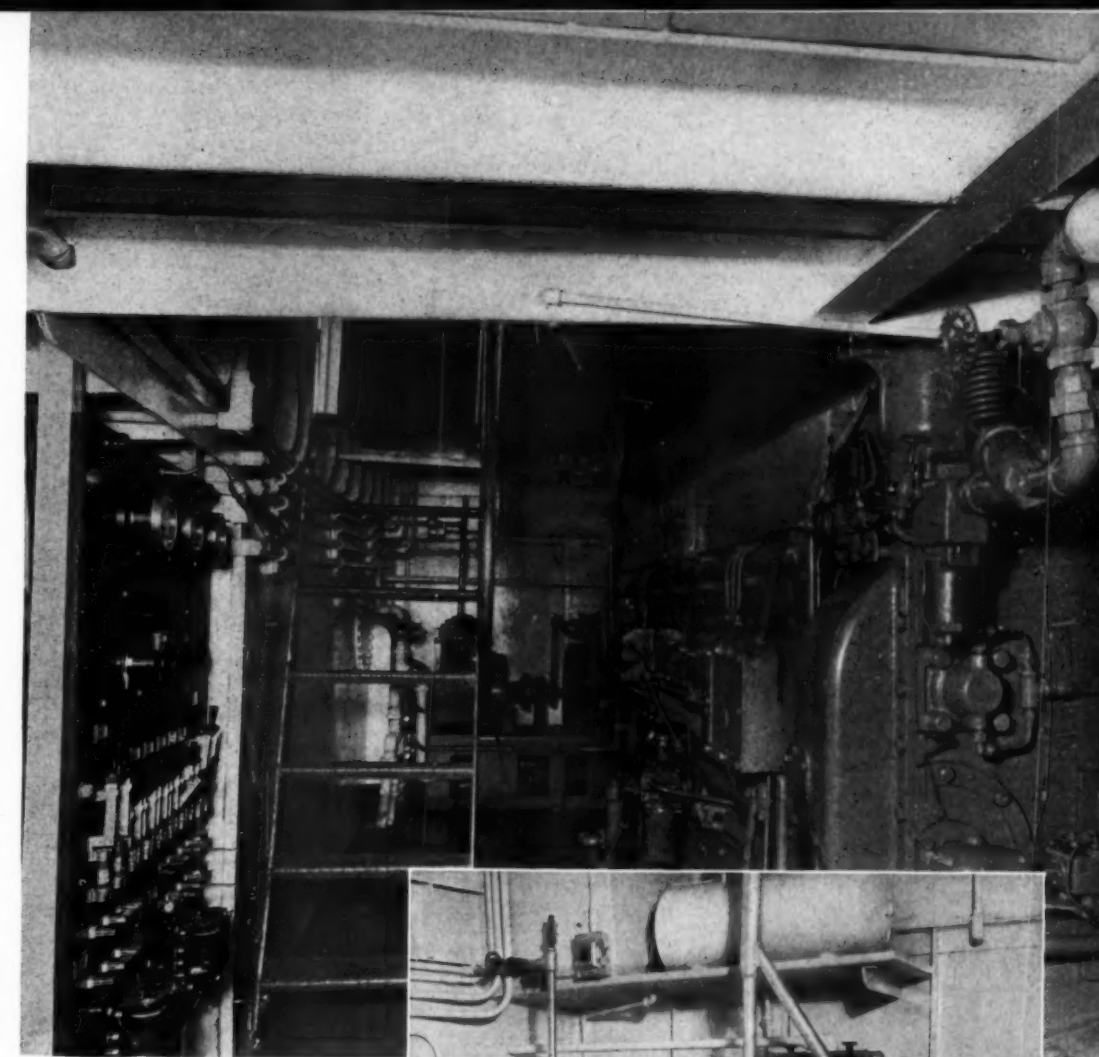
And the power plant matches the hull. This is a Cooper-Bessemer Diesel, air-starting, direct reversing, of six cylinders 10½" by 13½" and developing 300 hp. at 400 rpm. Diesel-minded people, familiar with New Orleans, will recall this engine, as it was on display in the show-window of the Calmes Engineering Company, Cooper-Bessemer distributors in the New Orleans area. Attractive in the extreme with its all-enclosed design, the engine is smooth-running and free from vibration under working conditions. Fuel injection is the patented Cooper-Bessemer system with pressure relieved between injection periods, resulting in fuel economy and clear exhaust. The pyrometer system is Wheelco, with thermocouples on each cylinder; Purolator Duplex filters protect the fuel lines; the governor is the standard Cooper-Bessemer overspeed; air-reverse rams are built-in, with lever control, for starting and maneuvering. Lubrication of the Diesel is full force feed throughout.

North Star is also equipped with Diesel auxiliary power, this being a unit developed by the Calmes organization. The power of the unit is a Lister-Blackstone Diesel of two cylinders, developing 12 hp. at 650 rpm., driving a 5 kw. Marvel Cord drip proof generator of 125 volts at 1750 rpm. Also included in the unit is a Quincy two-stage air compressor, clutch connected, of 17 cfm., and a fire and bilge pump, Viking, of 60 gpm. The Lister is cooled through the same Young Radiator heat exchanger that handles the propulsion Diesel.

For further guarantee of electric current supply, there is a 3 kw. Ideal generator, 110 volts, driven by a V-belt drive of three Goodrich belts. The main Diesel also has a built-in air-compressor, clutch-driven off the engine's side.

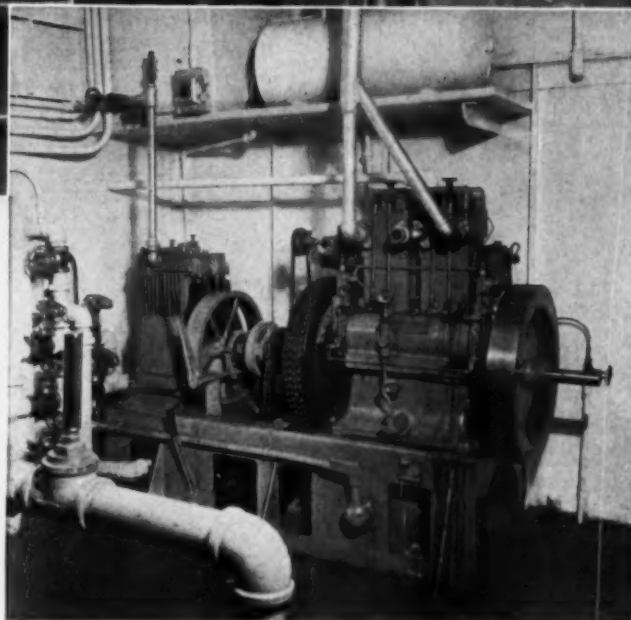
The boat's batteries are Edison, 90 cells, 110-120 volts, 150 ampere hours, of 3,000 watt capacity for full normal load; the switchboard operates with both the 3 kw. and the 5 kw. generator. The smaller generator, driven off the tail-shaft, is equipped with reverse current relays and automatic voltage regulator. Galley equipment features the WebbperfectionN oil-burning range and an electric refrigerator.

Other equipment items of the North Star include Russel and Stoll lighting fixtures, with all wiring in conduit; Kahlenberg Super Air-horn; Lane lifeboat for eight persons; Carlisle



*Close up of the Cooper Bessemer 300 hp. at 400 rpm. main Diesel engine installed on the "North Star." Note Purolator duplex filters.*

*The Lister 12 hp. at 650 rpm. Diesel auxiliary unit, engineered by the Calmes Engineering Company, driving a Quincy air compressor.*



and Finch 12" all-brass searchlight; Deming fresh water system, automatic, 250 gpm. at 40 lbs. pressure, furnishing water to galley, toilet and lavatory fixtures; Weinman circulating water pump, V-belt driven off main engine; inboard and outboard Goodrich Cutless bearings; Columbian Bronze Motorship propeller, 60" by 32". Interior finish of quarters and pilot house is clear heart cypress, natural finish in clear varnish. Steering is by hand, using a 54" mahogany steering wheel.

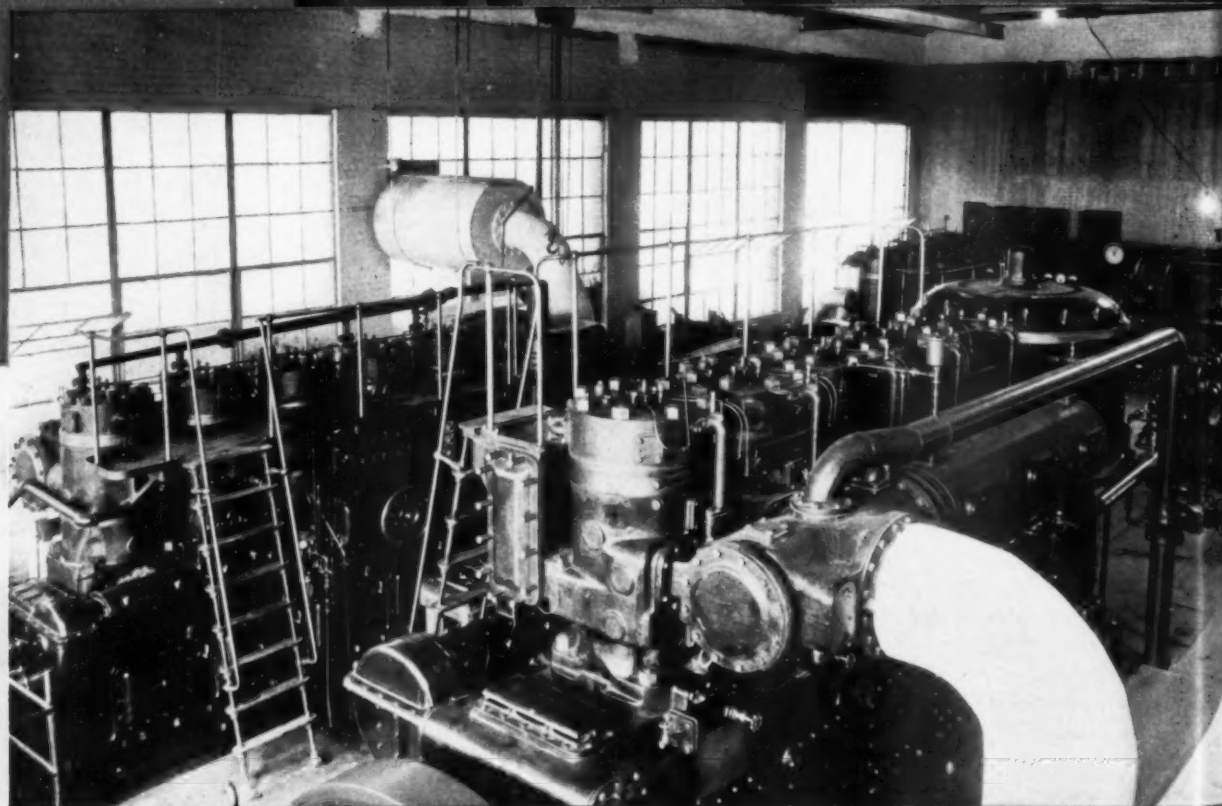
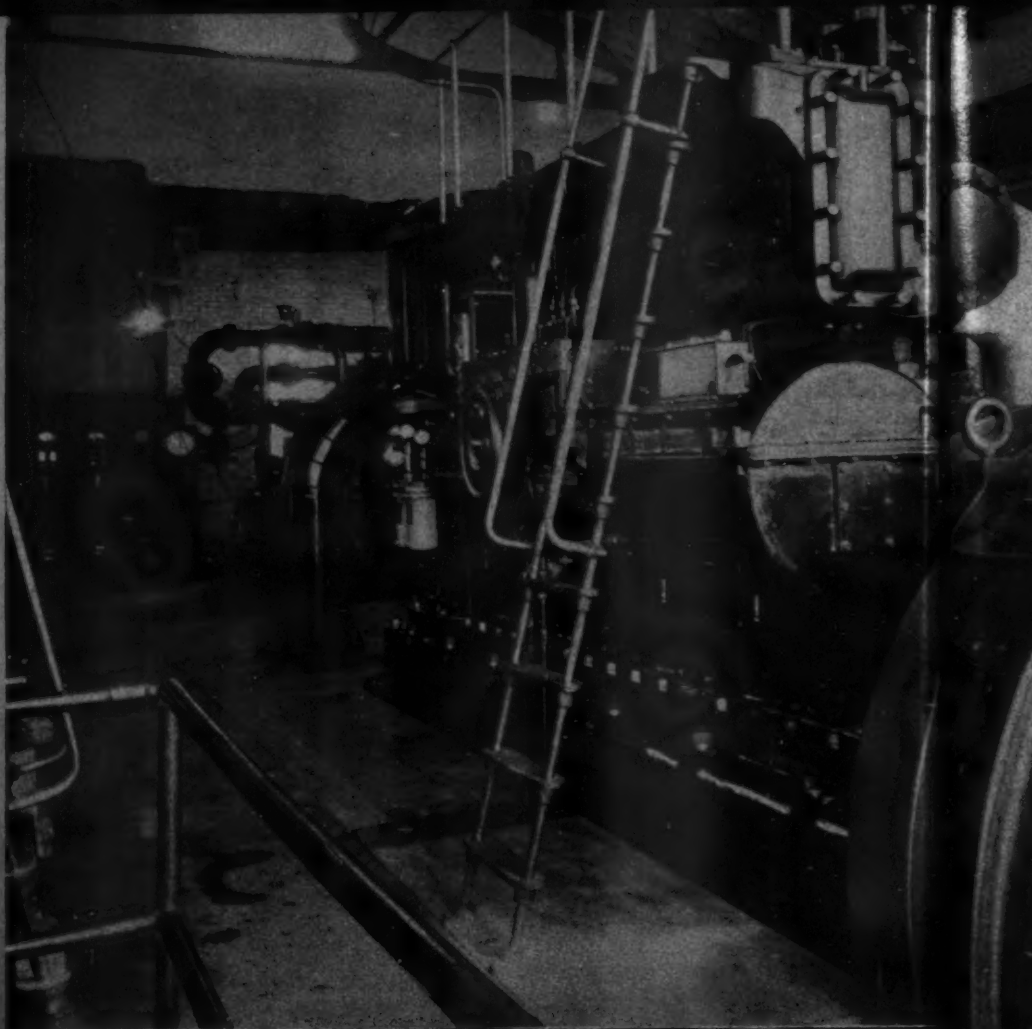
All in all, His Majesty, the King should have very little fault to find with the North Star.

For a tug of her size, it would be difficult to conceive of one of better construction, all-around design, or power plant. That her cruising radius is extensive is indicated by fresh water tank capacity of 1400 gal., 5,000 gal. of fuel oil carried in eight built-in tanks, and a 60 gal. tank capacity for lube oil. The North Star is amply able to go places.

The North Wind, accompanying The North Star to Canada, is also of quite recent construction, her dimensions being 80' 6" overall, 20' in beam, with a 10' depth of hold. Her power is an Atlas Diesel of 400 hp. at 300 rpm.

# GARLAND, TEXAS

By ORVILLE ADAMS



Top view: Operating side of the new F-M Diesel installed this year. Note Nugent Duplex fuel filter at rear of engine.  
Above: General engine room view showing the three F-M Diesels. Note Burgess intake Snubber, upper left, and Ross combination lube and jacket water cooler, extreme right. At the left is seen the new addition to the Garland power plant; Maxim exhaust silencers, extreme left.



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**A**BOUT twenty years ago, Garland, Texas, a city of nearly 3000 just fifteen miles east of Dallas, started its own power and light plant, with two semi-Diesel engines. The demand for power increased steadily and, in 1930, the first Diesel, a 240 hp. Fairbanks-Morse engine, was added to secure the load. For nearly a decade, these engines were sufficient to carry the load. Garland grew rapidly, however, and more residence load was added. Late in 1939 a five cylinder 14" x 17" Fairbanks-Morse, Model 33 two cycle Diesel, operating at 300 rpm. and rated at 575 hp., was installed. Within a few months, it soon became evident that another engine would soon be needed. National Defense projects came to the town, and increased use of light and power came with additional residence building. This year, another similar engine was installed. The new Diesel is a Fairbanks-Morse, Model 33 five cylinder engine, having 16" x 20" cylinders, and operates at 300 rpm. It is

rated at 875 hp. and is direct connected to a 758 kva. Fairbanks-Morse alternator with V-belt driven exciter. This engine is sufficient to carry the entire peak load, leaving ample standby capacity. An older semi-Diesel was removed from the plant, and only one of the original engines remains in operation; this a 150 hp. unit that has been operating nearly twenty years. The total installed capacity at present is 1840 horsepower.

The growth of this plant has been typical of the history of such municipal operations. The annual output by 1925 had exceeded 500,000 kwh. This increased to 750,000 by 1930, and reached nearly one million kilowatt hours by 1935. Accelerated growth of the city, however, is reflected in the output for 1939, which was then in excess of 1,150,000 kwh. This jumped, however, to more than 1,500,000 for 1940, and before the end of this year, it is anticipated that production of nearly 2,000,000 kwh. annually will be required to meet the demand.

Fuel and lubricating oil cost, including labor in the plant for the year 1940 is interesting. A total of 151,300 gallons of fuel oil and 2000 gallons of lubricating oil was used to produce 1,566,530 kwh., or better than 10 kwh. per gallon of fuel. The cost of fuel, lube oil, operators and engineers salaries did not exceed 7½ mills per kwh. Since the new engine, which is more economical than the older engines, will carry much of the load, it is expected that the fuel economy will be better than 12 kwh. per gallon for the current year. According to very accurate records kept by the chief engineer, C. E. Newman, approximately fifty cents out of each dollar of gross revenue from the plant is profit. The increase of gross receipts in 1940 over that of 1939 was about 29 percent, and this increase will be greater for 1941.

There are several interesting up-to-date features of the new installation. Among these are the lubricating oil accessories, which include a Ross lubricating oil cooler in combination with the cooling water heat exchanger, also a lubricating oil reclaimer. Practically new oil is circulated through the engine at all times. Mercoid switches, and Minneapolis Honeywell lube oil pressure and temperature controls govern the operation of the heat exchanger and oil cooler system. The operation of the entire system is automatic. Fuel oil is stored in underground tanks, and filtered to the engine day tank. In addition, the engine fuel system includes a Nugent Duplex filter just ahead of the fuel injection pumps. The fuel injection nozzles on the engine are water cooled. The new

engine employs a closed cooling system. Raw water is cooled by a Marley cooling tower, used in common for all engines in the plant. Soft water from the city supply circulates through the jackets and the heat exchanger.

The switchboard is a modern type, fully enclosed, and is equipped with G-E instruments and gear. Several changes were made in the electrical equipment and wiring, and much new equipment added to the cooling water system, as well as the piping for fuel and lubricating oil. A Youngstown Miller lube oil reclaimer serves the new engine.

Intake air is filtered through a Burgess Snubber, housed in a concrete cell to which air is drawn through a vertical stack some twenty feet above the street level. Exhaust from the engine is carried to an underground duct which leads to a Maxim silencer, located on the outside of the building. Good engineering of the intake and exhaust is indicated by the quiet operation of the engine, and noticeable lack of any appreciable back-pressure.

Each of the new engines is equipped with a Woodward governor, an Alnor exhaust pyrometer, and pressure gauges in the water, scavenging air, lube oil lines. These instruments are all mounted so that they are in plain view from any engine. Texaco lube oil is used.

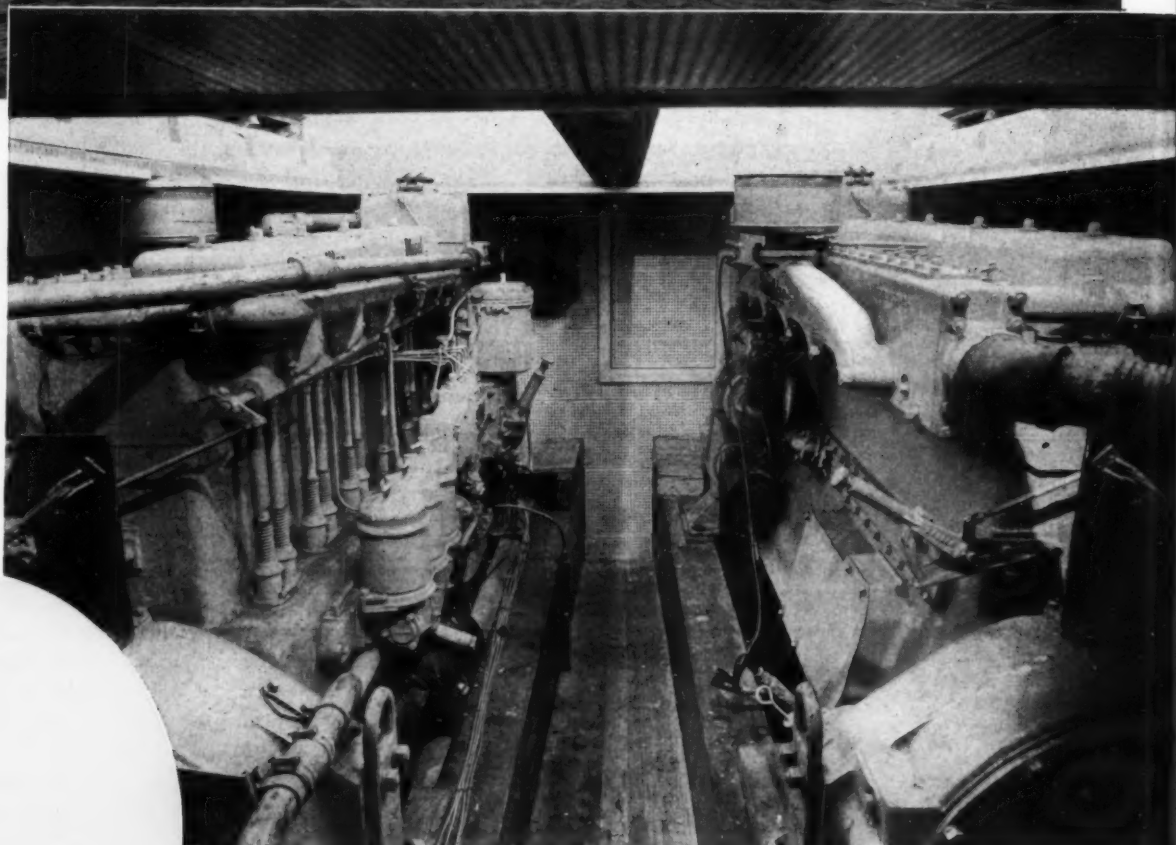
The fuel oil, lube oil and water piping, and oil lines from the engine to the reclaimer are all located in ducts under floor plates. Instruments are connected and operated electrically, with the temperature and pressure alarms being operated off dry cell batteries.

The Garland municipal plant has always carried a large percentage of the total load, the utility company having less than 25 percent at this time. It is expected that the plant will take over additional customers. About half of the total current generated is sold to the customers. Street lights, public buildings, the water department, and other city uses require large amounts of current. Station and line losses are about 10 per cent of the production. The distribution costs, labor, and maintenance are, however, much lower than the average for Diesel plants of this size. The total cost per kwh., including distribution and all other costs, does not exceed 11½ cents per kw. while the cost at the switchboard is around 1 cent, including all labor and repairs. In addition to free street lights, and power for water pumping, the yearly gross revenue is near \$40,000, with total expenses less than half this amount.



↑  
This trim pleasure craft, with accommodations for twelve persons, is powered with two Caterpillar Marine Diesels each rated 100 hp. at 900 rpm.

→  
Engine room view shows the two main Diesels. Note Purolator triplex lube oil filters.



# **HIGH POWERED DIESEL YACHT "SPORTSMAN"**

**A.** W. Covecevich of Biloxi, Mississippi, designed and built this 65-foot, twin screw yacht, *Sportsman* for Jack P. Burrus, President of the Tex-O-Kan Flour Mills at Dallas, Texas. The yacht, which has a beam of sixteen feet and a five foot draft, is outstanding for her unusual power plant. Two Caterpillar Diesel 100 hp. heavy-duty engines, operating at 900 rpm. turn 38" diameter, 37" pitch, three-blade, Hyde propellers through 2:1 Twin Disc reduction gears. The propeller shaft is Monel metal. The engines are equipped with Twin Disc hydraulic clutch controls, Bendix throttle control, and Exide starting and lighting batteries.

The engine room is insulated with Acousti Celotex. The yacht was designed for deep sea service, and has full accommodations for twelve. Her engines are rated for continuous service and give a cruising speed of approximately 15 mph. With her heavy duty power plant, the unusually large, heavy pitch propellers, she can maintain her speed in the rough seas often encountered during deep sea fishing trips in the Gulf and off the Bahamas. The tail end of a hurricane, which she ran through during a trial run, had no appreciable effect on her speed. *Sportsman* was completed early in 1941. Port Aransas, Texas, is her home port.



# Defense Savings Pay-Roll Allotment Plan

*Now company heads can help their country, their employees, and themselves*

voluntary pay-roll allotment plan helps workers provide for the future helps build future buying power helps defend America today

This is no charity plea. It is a sound business proposition that vitally concerns the present and future welfare of your company, your employees, and yourself.

During the post-war period of readjustment, you may be faced with the unpleasant necessity of turning employees out into a confused and cheerless world. But you, as an employer, can do something *now* to help shape the destinies of your people. Scores of business heads have adopted the Voluntary Pay-roll Allotment Plan as a simple and easy way for every worker in the land to start a *systematic and continuous* Defense Bond savings program.

**Many benefits . . . present and future.** It is more than a sensible step toward reducing the ranks of the post-war needy. It will help spread financial participation in National Defense among all of America's wage earners.

The widespread use of this plan will materially retard inflation. It will "store" part of our pyramiding national income that would otherwise be spent as fast as it's earned, increasing the demand for our diminishing supply of consumer goods.

And don't overlook the immediate benefit . . . money for defense materials, quickly, continuously, *willingly*.

**Let's do it the American way!** America's talent for working out emergency problems, democratically, is being tested today. As always, we will work it out, without pressure or coercion . . . in that old American way; each businessman strengthening his *own* house; not waiting for his neighbor to do it. That custom has, throughout history, enabled America to get things done *of its own free will*.

**In emergencies, America doesn't do things "hit-or-miss."** We would get there eventually if we just left it to everybody's whim to buy Defense Bonds when they thought of it. But we're a nation of businessmen who understand that the way to get a thing done is to *systematize* the operation. That is why so many employers are getting back of this Voluntary Savings Plan.

Like most efficient systems, it is amazingly simple. All you have to do is offer your employees the convenience of having a fixed sum allotted, from each pay envelope, to the purchase of Defense Bonds. The employer holds these funds in a separate bank account, and delivers a Bond to the employee each time his allotments accumulate to a sufficient amount.

Each employee who chooses to start this savings plan decides for himself the denomination of the Bonds to be purchased and the amount to be allotted from his wages each pay day.

**How big does a company have to be?** From three employees on up. Size has nothing to do with it. It works equally well in stores, schools, publishing houses, factories, or banks. This whole idea of pay-roll allotment has been evolved by businessmen in cooperation with the Treasury Department. Each organization adopts its own simple, efficient application of the idea in accordance with the needs of its own set-up.

**No chore at all.** The system is so simple that A. T. & T. uses exactly the same easy card system that is being used by hundreds of companies having fewer than 25 employees! It is simple enough to be handled by a check-mark on a card each pay day.

**Plenty of help available.** Although this is *your* plan when you put it into effect, the Treasury Department is ready and willing to give you all kinds of help. Local civilian committees in 48 States are set up to have experienced men work with you just as much as you want them to, and no more.

Truly, about all you have to do is to indicate your willingness to get your organization started. We will supply most of the necessary material, and no end of help.

**The first step is to take a closer look.** Sending in the coupon in no way obligates you to install the Plan. It will simply give you a chance to scrutinize the available material and see what other companies are already doing. It will bring you samples of literature explaining the benefits to employees and describing the various denominations of Defense Savings Bonds that can be purchased through the Plan.

Sending the coupon does nothing more than signify that you are anxious to do *something* to help keep your people off relief when defense production sloughs off; *something* to enable all wage earners to participate in financing Defense; *something* to provide tomorrow's buying power for your products; *something* to get money *right now* for guns and tanks and planes and ships.

France left it to "hit-or-miss" . . . and *missed*. Now is the time for *you* to act! Mail the coupon or write Treasury Department, Section A, 709 Twelfth St. NW., Washington, D. C.



**FREE - NO OBLIGATION**

Treasury Department, Section A,  
709 Twelfth St. NW., Washington, D. C.

Please send me the free kit of material being used by companies that have installed the Voluntary Defense Savings Pay-Roll Allotment Plan.

Name \_\_\_\_\_  
Position \_\_\_\_\_  
Company \_\_\_\_\_  
Address \_\_\_\_\_

want YOU to read this Message from the Treasury Department in the hope that YOU will send this coupon to Washington today and put this simple, effective plan into operation immediately.

This will be a long, hard war, and only by individual plus collective cooperation will it be won.

*Re H. T. Adams*

Editor—DIESEL PROGRESS

**O'BRIEN BROS.**

**REPOWER**

**ANOTHER TUG**

ACCORDING to reports, the O'Brien Towing Company was so well pleased with the performance of their first Mack Diesel marine engine that they have recently installed another in their tugboat *O'Brien Kids*. The Mack Mariner Diesel engine which they bought last year was installed in their tugboat *O'Brien Service* and, after more than fourteen months of severe operation, it convinced them that Diesel engines were both economical and reliable. During this period the tug worked ten to fourteen hours continuously each day, towing barges loaded with stone for a breakwater at Stamford, Connecticut; also towing derricks, moving and placing them along

the breakwater. Its performance so impressed the operators that they decided to repower their *O'Brien Kids* with a Diesel engine. After this exceptional demonstration of what Diesel marine engines could do, the *O'Brien Kids* was repowered with a Mack Mariner Diesel engine, replacing the old 100 hp., heavy duty, air-starting engine with which it was originally equipped. This latest Mack Diesel marine engine with electric starting equipment, according to the owners, has given more power with better handling and starting and has also made for a cleaner and more accessible engine room because of the compact engine construction and elimination of air compressor.

*Here is seen the tug "O'Brien Kids", equipped with its new Mack Mariner Diesel, towing a barge heavily laden with huge boulders and, right, a close-up of the tug.*





# Briggs

## OIL CLARIFIERS



### FUEL OIL CLARIFIERS

*"A Diesel engine is as good as its fuel."*

Briggs Fuel Oil Clarifiers are especially designed to whip fuel oil troubles by removing the gums, resins, rust, dirt, etc. Equally adaptable to gasoline filtration and bulk storage clarification. Designs available to meet any reasonable space limitation or flow rate.

Model F-50



### LUBE OIL CLARIFIERS D SERIES

*Rectangular Construction*

Briggs D Series Clarifiers are available in suitable sizes for any engine whether stationary, portable, or marine. Built-in separator eliminates the air from the oil, for better clarification. Clarifier case is all-steel, and all seams are double-welded throughout. Each unit is supplied with a built-in relief valve, thermometer, pressure gauge, and Briggs Fullers EARTH BLOCK cartridges.

Model D-2AX



### LUBE OIL CLARIFIERS DR SERIES

*Round Construction*

Briggs DR Models are purposely designed for direct full-flow installations with high working pressures. Clarifiers are capable of withstanding working pressures up to 100 pounds, and contain built-in relief valves for maintaining the most suitable pressure differential on the Briggs Fullers EARTH BLOCK cartridges for proper oil clarification.

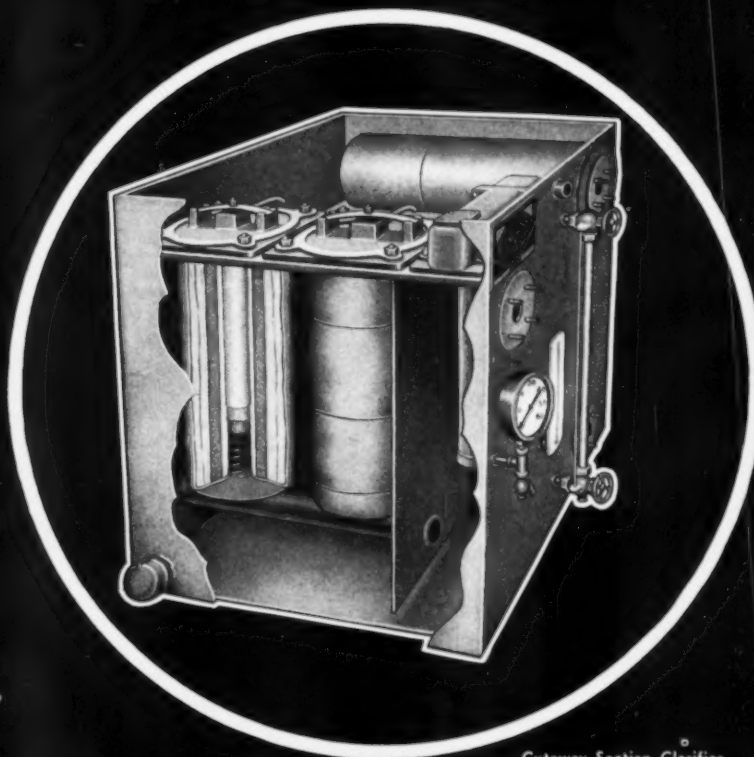
Model D-4AR



### LUBE OIL CLARIFIERS CD & CDJ SERIES

Briggs CD Series Clarifiers combine the full-flow metal edge strainers, the Briggs Fullers EARTH BLOCK cartridges, and the lube oil day tank in one unit. Ideal for dry sump engines and marine installations. Special designs are available to meet any reasonable limitation of space or rate of flow.

Model CD-1P-2-25X



Cutaway Section Clarifier  
Model CD-1P-2-25 Clarifier

To Specify Briggs Clarifiers Is To Provide

### INSURANCE FOR ENGINES

How Briggs Clarifiers assure maximum protection for more than one hundred million dollars worth of engines in Navy, Army, Coast Guard, Maritime Commission and industrial operations.

Briggs Equipped	Total Horsepower	Value of Engines
In 1938	41,510 H.P.	\$ 4,151,000 worth of engines
In 1939	89,550 H.P.	\$ 9,000,000 worth of engines
In 1940	203,955 H.P.	\$ 20,000,000 worth of engines
In 1941*	1,000,000 H.P.	\$100,000,000 worth of engines

\* 1941 Figures incomplete at press time.

Today, Briggs' new industrial plant in Washington, D. C., is turning out an ever-increasing number of lube oil and fuel oil clarifiers to meet the demands of the Navy, Army, Coast Guard, Maritime Commission and industrial operators for engine protection and economy through continuous maintenance of oil. The experience of hundreds of Diesel operators has shown—the best oil clarification equipment is the least expensive in the long run.

### A Tip For You In 1942

When the cost of a Briggs Clarifier (designed and engineered to do the job) is less than 2% of the engine's cost, that 2% may well be the best value your money can buy.

For full information and catalog, write Dept. L7

## BRIGGS CLARIFIER COMPANY

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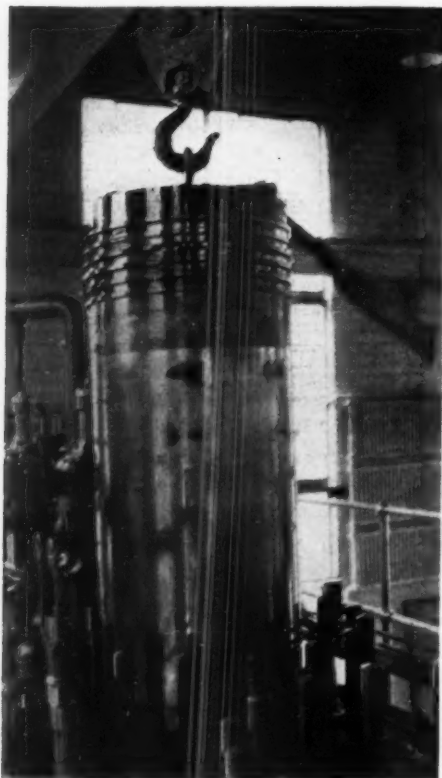
WASHINGTON, D. C.

## OVERHAULING YOUR DIESEL UNITS

Part 3.

By R. L. GREGORY\*

**I**N last month's article, following the progressive steps of the annual inspection, we had arrived at the point of replacing the pistons in their respective liners. The accompanying cut shows a piston about to be replaced. You will note that the rings have been properly spaced as to staggering of the gaps and that the piston has been well coated with lubricant. The reason for so coating the piston heavily with cylinder oil is to insure a film of oil between the piston and liner, since you will have to turn the unit over several times in further inspection work before putting it on the line or back in service, and since this turning-over will be done with the barring-over equipment, the lubri-



cators which supply oil to the liners will not function fast enough to insure good lubrication at this slow speed.

\* Chief Engineer, Municipal Water and Light Plant, Hillsdale, Michigan.

Upon completion of reinstalling the pistons, all bolts should be well tightened and the nuts laced with wire to prevent their loosening and coming off. The cylinder heads and attendant piping can now be reinstalled and this feature of the work completed.

### Crankcase

After completing this phase of the work, the crankcase should be thoroughly cleaned. It is impossible to get all the sludge and foreign matter out by simply draining. It is, therefore, a good idea to wipe out and possibly wash the crankcase with either light fuel oil or naphtha. When this has been cleaned, the oil sump should also be cleaned, and the pump and drives inspected to insure perfect operation. Upon completion of this work, the crankcase can be closed and is ready for a supply of fresh oil.

### Air Compressor

If you are operating an air injection engine while the foregoing work has been in progress, a couple of mechanics can dismantle the compressor or blower and inspect the various parts, particularly the valves, rings and various ports. Many compressors on scavenging units have three stages of compression: low, intermediate, and high. Great care should be exercised in seeing that these valves, seats, springs, and adjustments are properly taken care of. Due to the functions performed by the compressor, these can be checked by watching the air gauges on the various stages which readily show any leaks from one stage to another. These valves should have attention periodically and should not be depended upon to function properly from one annual inspection to another. But, at the time of the annual inspection, a very thorough going-over should be given them, and in case any weakness or worn condition exists, they should be replaced at once, since the efficiency of the compressor is highly dependent upon the proper functioning of the compressor valves. Good operation of the compressor valves also hinges on clean cooler coils and it is well to remove these coils, clean, and test them

after approximately 5000 hours' operation. In testing them, they should be given a hydrostatic test of twice their working pressure, which is standard practice. Also inspect the coil supports and bracing. Another important item in this connection is a thorough inspection of the scavenging valves. These valves generally consist of a series of valves, valve seats, distance pieces, top and bottom covers, and guides, arranged progressively on a supporting bolt. When making your annual inspection, these valves should be removed and each valve dismantled, thoroughly washed and cleaned, and various parts inspected for wear and breakage. A supply of valves and valve seats should be part of your spare equipment in order to facilitate repairs. While these valves are out being cleaned and inspected, it is well to have one of the workmen clean and wipe out the scavenging header before replacing the scavenging valve assembly.

### Generator and Exciter

It is mighty important, in your annual inspection, to give careful attention to the electrical end of your equipment. Most of all the generating equipment furnished now is supplied with sole plates under the stator supports to facilitate the moving of the stator sideways, in order to clean and inspect the rotor. Regardless of how immaculate your plant may be or the efforts you put forth in keeping your generating equipment clean, oil vapors will collect on the stator and rotor coils, and particles of dust will be drawn in from the surrounding air and stick to this oil film. At the annual inspection, therefore, it is a mighty fine idea to move the stator over on the sole plates and thoroughly clean and wash the coils, preferably with carbon tetrachloride, since this is a good cleaning solution and does not injure the insulation. After this has been done, it is well to blow out the windings with air. Judgment must be used in this matter, however, especially with generators which have been well loaded and consequently heated up. This heat has a ten-  
... And now please turn to page 57



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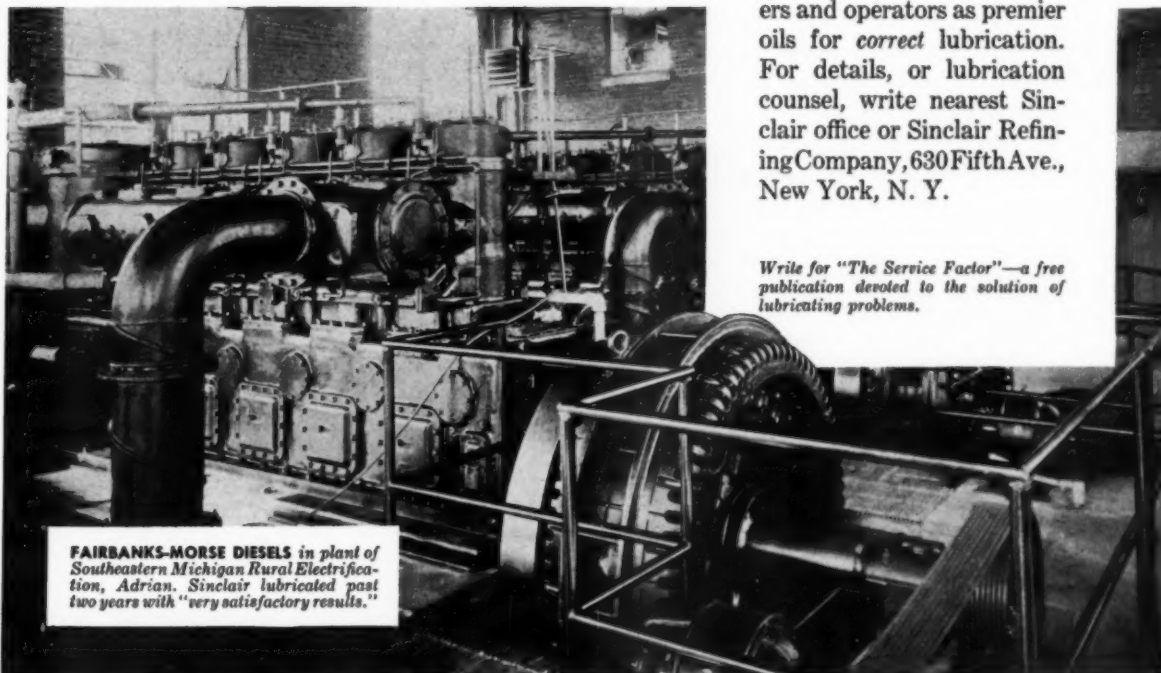
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### DEFENSE DRIVE

bans unnecessary lay-offs. Proper lubrication prevents forced shut-downs. For DIESEL ENGINES there are...



**FAIRBANKS-MORSE DIESELS** in plant of Southeastern Michigan Rural Electrification, Adrian. Sinclair lubricated past two years with "very satisfactory results."

### ... SINCLAIR RUBILENE

**OILS** supported by a long record of perfect performance in heavily loaded installations. Rubilenes are recognized by Diesel builders and operators as premier oils for *correct* lubrication. For details, or lubrication counsel, write nearest Sinclair office or Sinclair Refining Company, 630 Fifth Ave., New York, N. Y.

Write for "The Service Factor"—a free publication devoted to the solution of lubricating problems.

# SINCLAIR INDUSTRIAL OILS

SINCLAIR REFINING COMPANY (Inc.)

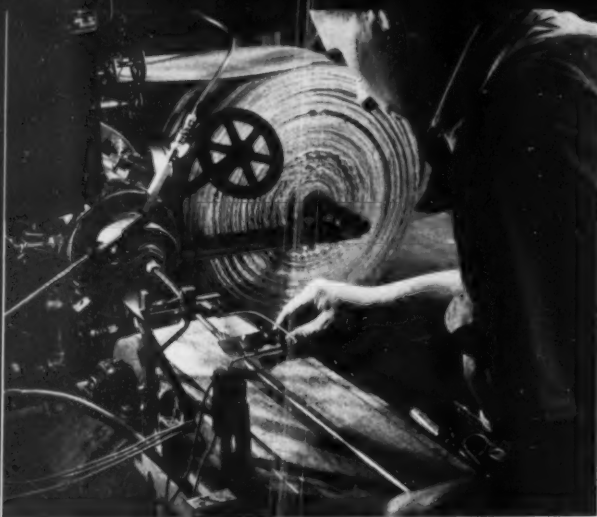
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CHICAGO

10 WEST 51ST STREET  
NEW YORK CITY

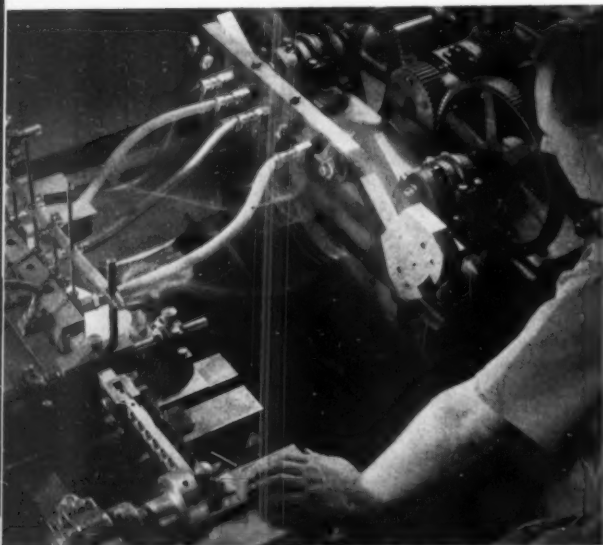
RIALTO BLDG.  
KANSAS CITY

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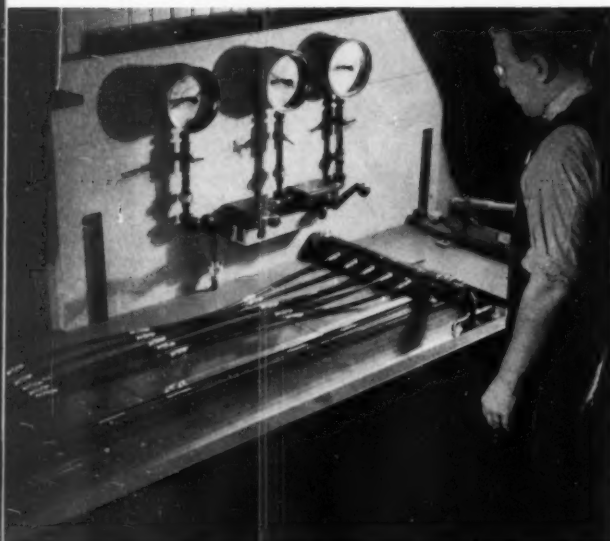
FAIR BUILDING  
FT. WORTH



Close-up of "PVA" extruder, which produces continuous lengths of tubing under automatic control.



This "torture machine" tests the hose for its flexibility, resistance to vibration and torsion under oil pressure. The temperature of the oil is also controlled to approximate operating conditions.



Static pressure tests on Diesel hose are conducted on this equipment. Pressures up to 2,500 pounds per square inch are withstood by 3/16" I.D. hose.

Cutaway view of the Resistoflex fitting which provides a vibration proof and oil-tight connection.



## NON-SLOUGHING FLEXIBLE HOSE FOR DIESEL FUEL AND LUBE LINES

**W**ITH United States at war and supplies of both synthetic and natural rubber due for even more careful rationing, increased interest is being shown in other types of flexible hose for conducting Diesel fuel and lubricating oil. A construction that has been on the market for some time and is now receiving the attention of many American Diesel manufacturers employs polyvinyl alcohol as an inner tube. This synthetic resin is extremely tough, flexible, vibration proof, and entirely impervious to oils and organic solvents. Being entirely inert to hydrocarbons this material does not swell or slough off after prolonged use. Hence, it is used as standard equipment by several Diesel manufacturers for conducting fuel from supply tanks to transfer pumps, from transfer pumps to injection pumps, and as flexible lines for oil filters. Resistoflex Corporation of Belleville, New Jersey, devoted several years to the development and perfection of "PVA" tubing, and is responsible for the creation of this type of Diesel hose.

The following table shows the behavior of Resistoflex P.V.A. tubing immersed in various solvents for periods of 120 days.

Solvent	Condition of tube after immersion
Diesel Fuel	Unaltered
Gasoline	Unaltered
Ethyl Gasoline	Unaltered
Benzene	Unaltered
Turpentine	Unaltered
Toluene	Unaltered
Xylene	Unaltered
Methanol	Unaltered
Freon	Unaltered
Ethanol	Unaltered
Isopropanol	Unaltered
Methyl Acetate	Practically Unaltered
Ethyl Acetate	Same as for Methyl Acetate
Isopropyl Acetate	
Perchloroethylene	Unaltered
Methyl Chloride	Unaltered
Ether	Unaltered
Butane	Unaltered

Cutaway view of "PVA" lined Diesel hose showing the inner tube, the braided sheathing and the outer cover.



Dioxan	Unaltered
Acetone	Unaltered
Hexon	Unaltered
Ethyl Aceto-acetate	Practically Unaltered
Acetylene	Unaltered
Methylene Dichloride	Unaltered
Chloroform	Unaltered
Carbon Tetrachloride	Unaltered
Carbon Disulfide	Unaltered
Trichlorethylene	Unaltered
Sulphur Dioxide	Unaltered

Blended Fuel	{ 66 parts Gasoline } { 24 parts Ethanol } { 10 parts Benzene }	Practically Unaltered
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Swelling tests of Resistoflex P.V.A. immersed in hot oil for 144 hours, show the following results; Mineral Lubricating Oil at 250°F... Negligible shrinkage; practically unaltered. Kerosene at 165°F. (flash point at 187°F)... Negligible shrinkage; practically unaltered.

Its physical properties are also interesting. Because of its high tensile strength and the fact that it is virtually indefatigable, a relatively thin inner tube can be used which assures maximum flexibility under repeated vibration and torsional strains. These properties, in addition to its immunity to oxidation and aging greatly increase the serviceable life of this hose. Another valuable property of P.V.A. tube pertaining to Diesel installations is its non-sloughing characteristic.

The construction of Resistoflex P.V.A. hose other than the tube, is similar to that of other flexible non-metallic hose. The extruded P.V.A. inner tube passes through a high-speed braider, receiving one or two cotton braid sheathings. The outer cover is compounded for water, oil, and heat-resistance, depending upon the application. It can be a lacquer, wire braid, or synthetic rubber cover. The latter cover will no doubt be reserved for defense uses such as fuel, viscometer, oil-gauge and lubricant lines on Diesel engined military vehicles, for which this has been approved and supplied.

The flexibility of Resistoflex Diesel hose is demonstrated in this view showing a length of hose bent in two directions.





## Supervising and Operating Engineers' Section

Continued from page 51

tendency to dry out the insulation, making it brittle, and if too high air pressure is used, it may injure this brittle insulation. It is also good practice to give your coils a good coat of protective insulating varnish after you have thoroughly cleaned them.

All brushes and brush rigging and cables leading from the generating units should be inspected at this time. If you have a megger available in the plant it is well to make an insulation test on the unit while down, both before and after cleaning, and incorporate your findings in your records.

### Governors

This is another vital point for inspection. While the governors, control, overspeed, if provided, and air governor on an air injection unit should have inspection more than once a year, the yearly overhaul of these parts should be thorough. Make sure that all connections are tight yet sufficiently free to insure proper regulation.

When a unit is equipped with an overspeed governor it should be operated at least once a week to insure proper functioning. The air line to this governor should be inspected to see that there has been no carry-over causing the line to fill with lubricating oil or carbon, and clogging it.

The matter of governor lubrication should be well taken care of. See that the dash pots are properly filled with the proper oil, and it is a good practice to use a common spray gun and spray the whole working parts of the governor with a good grade of light lubricant. You cannot overdo this practice, but it will insure free operation of the various parts, gears, linkage, etc.

### Starting Valve

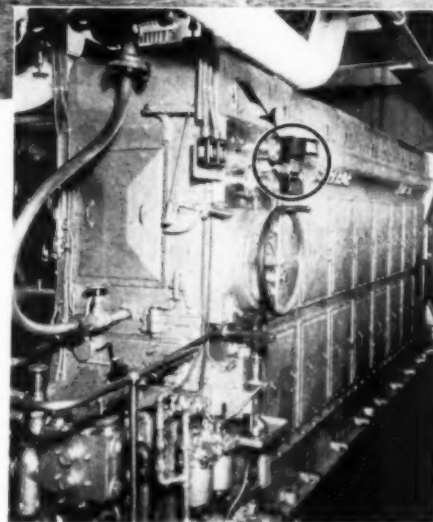
This valve should be inspected at least every three thousand hours of operation and oftener if found to be leaking. If you find it necessary to grind the valve seat, it should be carefully done, the guide should be free, and the piston and rings should work freely in the valve body.

### Air Filters

Local conditions govern the cleaning of these filters. If your unit is operating in a locality where considerable dust, lint, and like



Illustrations show the new Army Tug "Maj. George H. Harrell" and her main Superior Diesel with "Alnor" horizontal edgewise exhaust pyrometer.



## Army Tugs Powered By Superior Diesels With "Alnor" Protection.

Five up-to-the-minute Diesel tugs recently added to the U. S. Army's towing fleet are the "Col. Ernest H. Agnew"; "Brig. Gen. John B. Bellinger"; "Col. Richard T. Ellis"; "Col. William G. Gambrill"; and "Maj. George H. Harrell". These tugs are identical and were designed and built by Equitable Equipment Company, Inc., of New Orleans, under supervision of Lt. Col. W. W. Moore of the U. S. Army Quartermaster Corps. Each tug is propelled by a Superior, 8 cylinder Diesel of 560 hp. at 400 rpm. with an Alnor 8-point, horizontal edgewise exhaust pyrometer for protection.

*Insist on the best protection for your Diesel or gas engine investment.*

*Specify or buy "Alnor"  
Ask for Catalog*



*Illinois Testing Laboratories Inc.*

423 NORTH LaSALLE STREET, CHICAGO, ILLINOIS

*Manufacturers of "Alnor" and Price Instruments—Products of 41 Years' Experience*

material is prevalent, they must be cleaned at shorter intervals. If the air intake is free from excessive dust, twice a year should be ample. Clean air is of vital importance, however, and the air filters when found dirty should be thoroughly washed and then dipped in light oil, which will help to retain the dust in the filters instead of letting it pass through.

The final article on this subject will appear in our next issue.

### Buda Appoints Ralph R. Hayes

THE Buda Company is pleased to announce the appointment of Mr. Ralph R. Hayes as their Eastern District Sales Manager. He will be attached to the New York office with headquarters at 253 West 64th Street, New York.

Mr. Hayes is well known to trade on the eastern seaboard, especially to the marine and fishing industries. His experience includes two years as Eastern Engine Representative for the Cater-

pillar Tractor Company; five years in the U. S. Dept. of Justice Customs Agency Service; and six years as Line Construction Officer of boats for the U. S. Coast Guard, Washington, D. C. He has served six years with the U. S. Navy, and he holds a Master Pilot's license in both the United States and Canada. Mr. Hayes replaces Lew Crafts who recently resigned from our organization.

### Purolator Buys New Plant

INCREASE after increase in after-market sales through dealers, accounts for the purchase of a new plant by Purolator Products, Inc., Newark, N. J. The new plant is located in Newark, near the company's main office and factory.

Were it not for the increase in dealer sales, Purolator's American facilities, operating three shifts a day, would have been ample to produce the requirements of the Government defense orders in addition to previous dealer requirements.

Plants producing Purolators for Britain and export, located in England, were at last reported undamaged and operating.

### National Supply Appoints Arch F. Campbell

THE National Supply Company announced on December 15 the appointment of Arch F. Campbell as Manager of Sales of its Superior Engine Division.



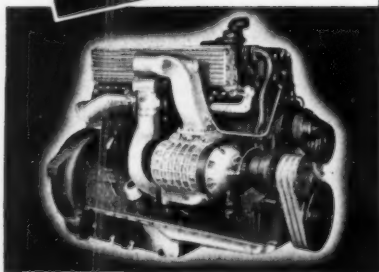
Arch F. Campbell

Previous to his appointment, Mr. Campbell was Branch Manager at Tulsa, Oklahoma, for the Waukesha Motor Company. Mr. Campbell has been affiliated with the Oil Industry for the past twenty-two years in the mid-continent area. Following his graduation from the University

## There'll NEVER Be a Shortage in the demand for dependability

BELOW: Frank W. Albert, Bigler, Pa., operates a pair of 2½-yard Lima 1201 Shovels, each powered with a Cummins Diesel.

BELOW: Model HBS-600 (Supercharged) Cummins Dependable Diesel, 200 hp. at 1800 rpm.



Today—a contractor may face a shortage in men, material or equipment . . . but never in the need for proved power . . . assured dependability.

This doesn't mean power "proved" and dependability "assured" on the test block . . . the soft snaps . . . the 40-hour week. This means power *proved* and dependability *assured* by a 9-year record on the tough jobs . . . in the muck and mire . . . on the gruelling grades and under the engine-killing loads . . . in any weather and at all altitudes. This means full-rated power at the wheel 24 hours a day and 7 days a week . . . faster work cycles . . . uninterrupted operations. *This means Cummins Diesel power.*

Yesterday, a delay on the job hurt only you. Today, a delay on the job hurts America. Make every minute and every hour count by specifying Cummins Dependable Diesels for your heavy-duty equipment. Cummins Engine Company, Columbus, Indiana.

BELOW: One of six 14-yd. bottom dump Euclids, all powered with Cummins Diesels, which T. E. Connolly, Inc., San Francisco, is using on the Cottage Grove Flood Control Dam.





the U. S. Service; and of boats on, D. C. S. Navy in both Hayes re ned from Newark. Newark. tory. der sales ng three to pro- ment de s dealer ain and st report nounced Arch F. Superior bell was for the bell has for the nt area- iversity

of Michigan in mechanical engineering in 1918, he entered the service of the United States Army as a flying officer. Following his discharge from the Army, he became associated with the M. J. Sullivan Independent Oil Producer at Ranger, Texas, and in Indiana, and in 1920 joined the Production Department of the Phillips Petroleum Company.

From 1921 to 1931, Mr. Campbell was associated with Fenwick Reddaway Manufacturing Co., Newark, N. J., as its Oil Field Sales Representative.

In 1932, he represented the Michigan Valve and Foundry Company, Detroit, Michigan, in the oil field, and later in the year joined the C. F. Camp Company, Tulsa, Oklahoma, as Waukesha factory representative. For the past nine years, he has been in charge of the Tulsa Branch of the Waukesha Motor Company which heads the company's oil field sales.

Mr. Campbell will make his headquarters at the Superior Engine Division Plant at Springfield, Ohio.

### New Whitcomb Diesel-Electric Locomotive

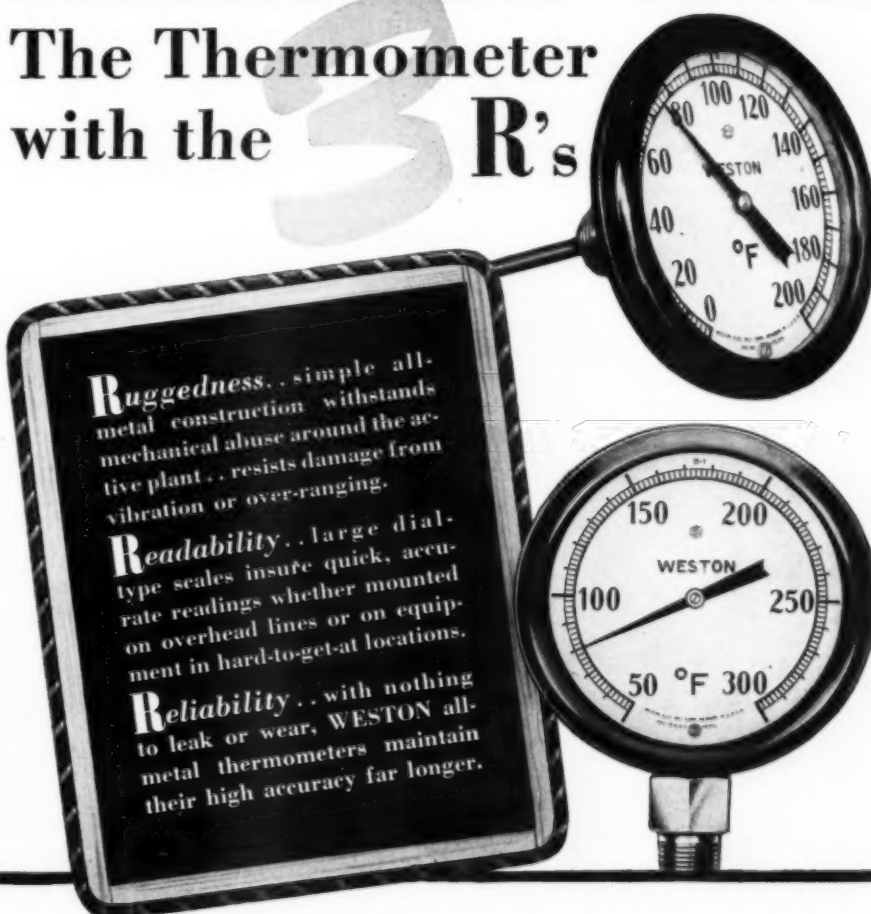


THE Whitcomb Locomotive Company, Rochelle, Illinois, has added a new Diesel-electric to its line of internal combustion locomotives. It is an 80-ton unit powered with two Buda supercharged Diesel engines, each developing 325 hp. which proves ample power to insure snappy performance in switching and spotting cars, as well as road work at speeds up to 40 mph. The weight in working order is 160,000 lbs., and the normal tractive effort is 40,000 lbs. at 25% adhesion. The locomotive is capable of exerting 53,330 lbs. tractive force with the use of sand. A unique feature of the design is the arrangement of the power plant assemblies. Each engine-generator unit including radiator, air compressor, and blower is mounted on a common sub-base mounted on the locomotive frame. Instead of the usual arrangement with the radiator at the front end, the assembly has been turned around, placing the radia-

tor at the rear near the cab. Adjustable shutters are provided on each side of the hood for air inlet to the radiators, maintaining even water temperatures in both engines. Another important advantage of the power plant arrangement is the accessibility of the generators for inspection. The complete sub-base assembly can be easily removed through a hatch in top of hood. The trucks are of the built-up type, securely welded together. Traction mo-

tors are mounted on each of the four axles and the power is transmitted by means of single reduction gearing. Force ventilation of the traction motors is provided. The cab is well insulated and equipped with safety glass windows rubber-mounted in steel sash. Maximum vision in either direction is provided for the operator. Vestibule type stairwells are located at each of the four corners for the safety of the operator and switchman.

## The Thermometer with the 3 R's



WESTON Thermometers are available in both angle and straight stem types, with stainless steel stems from 2" to 24", and scale diameters up to 6". Accuracy guaranteed within 1% for the industrial types

... 1/2 of 1% for the laboratory type. Booklet containing complete information gladly sent on request. Weston Electrical Instrument Corporation, 579 Frelinghuysen Avenue, Newark, New Jersey.

# WESTON

*All Metal* THERMOMETERS

THE Maritime Commission has let contracts for nine seagoing tugboats to cost slightly in excess of \$1,000,000 each, to be built by two shipyards. These are the Globe Shipbuilding Company, Superior, Wisconsin, who will build five of these vessels, and the Avondale Marine Ways, Inc., New Orleans, Louisiana, who will build four.

Thirteen of this type vessel have now been ordered by the Commission and deliveries are to be made between July and November, 1942. These tugs are the largest commercial vessels

of their type, having an overall length of 194 ft. 9 in., a molded breadth of 37 ft. 6 in., and a designed draft of 15 ft. 6 in., and are known as Design V4-M-A1. They will be propelled by 2250 hp. Diesel engines.

#### 900 Hp. Diesel Stand-by for Michigan Bell Telephone Headquarters

THE Michigan Bell Telephone Company is planning to install forty-two Diesel engine-generator sets in various buildings to safeguard

telephone service in its larger exchanges. These engines will be used for stand-by service should the ordinary power sources fail. Recently installed in its headquarters building in Detroit is a 900 hp. Diesel, the largest of these units to be ordered. The other units range from 30 to 350 hp. A well 126 ft. deep was drilled for the Detroit unit to insure a permanent supply of cool water, and a 5,000 gal. fuel oil tank was also installed.

#### Robert P. Ramsey to H.O.R.

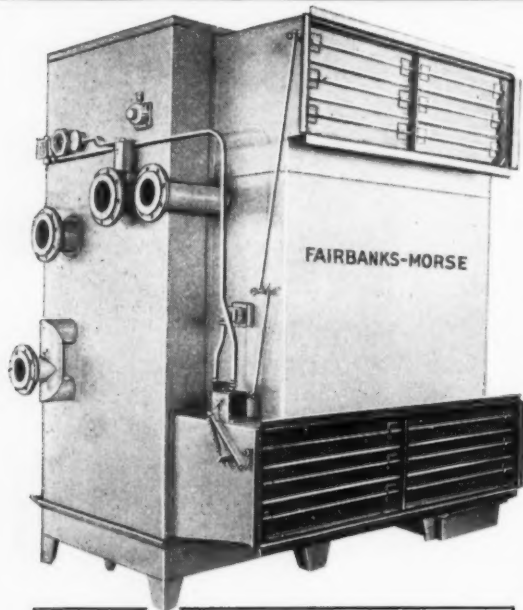


ROBERT P. RAMSEY, more popularly known as Bob Ramsey, became Chief Engineer of Research for the Hooven, Owens, Rentschler Division of the General Machinery Corporation of Hamilton, Ohio, and his many friends in the Industry will, I know, join with us in extending to him hearty congratulations and sincere wishes.

Mr. Ramsey graduated from the Massachusetts Institute of Technology in 1922 and his first contact with the Diesel industry was in applying Diesel engines to logging operations on the west coast and, in the process, worked with the Atlas Imperial Diesel Engine Company where he was largely instrumental in introducing that company's products into the logging industry. Later, he joined the Buda Company at Harvey, was promoted to Chief Engineer of its Diesel Division and, under his guidance, the Buda Company took the original M.A.N. high-speed Diesel license for this country, later developing a series of small Diesel engines for the Navy. He was with the Buda Company for approximately five years.

From Harvey he went to the Philadelphia plant of the National Supply Company as Chief Engineer and here he developed and built a com-

## Here's the Modern Way to Cool Jacket Water



#### FAIRBANKS-MORSE EVAPORATIVE COOLER

Type C, with full thermostatic control. Lube oil temperature is controlled independently of jacket water temperature. Other types provide for semi-automatic and for manual control.

• The new Fairbanks-Morse Evaporative Cooler, operating on a closed system, provides the modern way to cool jacket water.

This new Cooler takes little space — can be located in the engine room, right under the engineer's eyes. It operates efficiently . . . eliminates all possibility of freeze-ups . . . requires practically no maintenance. It *saves fuel* by keeping jacket water and lubricating oil *always* at the same, ideal temperature. And by circulating *clean, soft water*, it keeps jacket passages free from scale and dirt. That means lastingly efficient cooling and the resultant freedom from engine maintenance and repair work.

Where the F-M Evaporative Cooler replaces a heat exchanger using raw water, it effects a considerable saving in water and pumping costs. Yet despite all these advantages, it costs less than others to buy and to install.

Would you like the complete story? You'll find it in Bulletin FECD-2, which includes dimension drawings, piping diagrams, capacity tables, etc. To get a copy, write Fairbanks, Morse & Co., Dept. A-134, 600 S. Michigan Ave., Chicago.

# FAIRBANKS-MORSE & CO.

Air Conditioning Division  Chicago



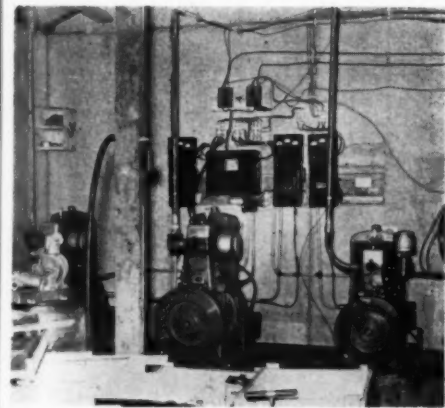
These complete line of high-speed Diesel engines, incorporating his well-known dual-combustion system. He also, during this same period, took an active part in developing supercharging ideas for application to high-speed Diesels. He was with the National Supply Company for some eight years, the last part of which he was Executive Engineer of the National Supply Company's Diesel Division, with supervision over both Springfield and Philadelphia plants insofar as engineering work was concerned.

Mr. Ramsey stands very high with the Navy Department in Washington. It was through his efforts that the Navy was able to Dieselize many of its small craft as early as 1933. In cooperation with the Navy, both in his work at Buda, and later at Philadelphia, he developed a line of Diesel marine engines that have served the Navy well and will continue to do so.

In his new work at Hamilton, he will have behind him all the resources of the famous Hamilton Engine Shops.



#### Witte Dieselectric Plants in Little America



THESE Witte Dieselectric Plants in the engine room of Admiral Byrd's Expedition in Little America, played a big part in supplying comforts and conveniences to that brave group of explorers. During all their long stay in ice-bound Antarctic, these Dieselectrics were the only source of power for electric light, radio, communication, and machine shops. They were always dependable, on the job day and night, month after month. They were produced by the Witte Engine Works, Kansas City, Mo., who make a full line of Diesel engines of various sizes for many uses.

#### Bethlehem's Staten Island Yard Launches A Destroyer

THE U. S. S. *Farenholt*, destroyer DD-491, was added to our fast growing fleet in an early morning launching November 19 at the Bethlehem Steel Co., Shipbuilding Division, Staten Island Yard. Built at a cost of nearly \$6,000,000 the U. S. S. *Farenholt* has a displacement of 1650 tons, the same as the recently launched U. S. S. *Bristol* and the torpedoed U. S. S. *Kearny*. Presiding at the launching was Rear

Admiral A. Farenholt (M.C.) U.S.N. (Ret.), son of the late Rear Admiral Oscar W. Farenholt, U.S.N., for whom the destroyer was named and whose great grandniece, Miss Nancy Garland, sponsored the vessel. Although this shipyard has built four destroyers since the last war, the U. S. S. *Farenholt* is the first to be built during the present emergency. Also built here, since 1938, were five C-1 cargo ships and three fleet tugs, the first of the multiple Diesel-electric type and the largest tugs in the world.



## FOR WANT OF A DROP.....

For want of a drop of oil at the right time and place many new machines have been seriously damaged during initial run-in following assembly . . . To avoid this waste, more and more manufacturers depend upon "dag" colloidal graphite . . . Send for Technical Bulletin No. 112R and name of local supplier.

**ACHESON COLLOIDS CORPORATION**  
PORT HURON, MICH.

"dag" is a registered trade-mark of Acheson Colloids Corporation.

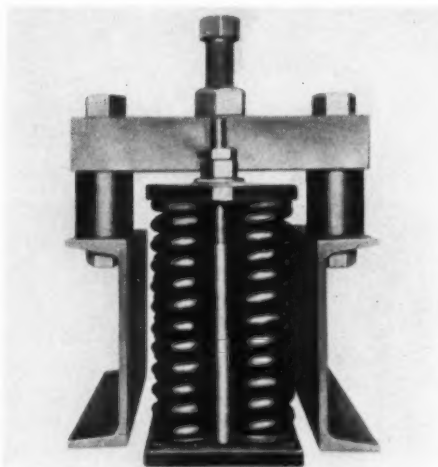


## Resilient Mounting at Skaneateles, New York

FURTHER information on the municipal Diesel installation at Skaneateles, New York, which was described in the December issue of DIESEL PROGRESS, pertains to the steel spring resilient mounting of its concrete base. It is well known that the natural operating frequency of a Diesel this size and turning at relatively high speed would be transmitted for some distance without proper foundation isolation. This phase of power plant engineering is particularly important in connection with a municipal installation where the engine room is situated in the heart of a community. The smooth performance and quiet operation of this plant during the past year were previously noted last month but space did not permit any detailed discussion of the foundation design and construction which made this possible.

The six cylinder, 540 hp. Alco Diesel at Skaneateles turns at 600 rpm. and with the generator weighs 55,000 pounds. Both engine and generator are integrally mounted on a concrete base weighing an additional 80,000 pounds, making a total mass to be isolated of nearly seven tons. It will be recalled further that an

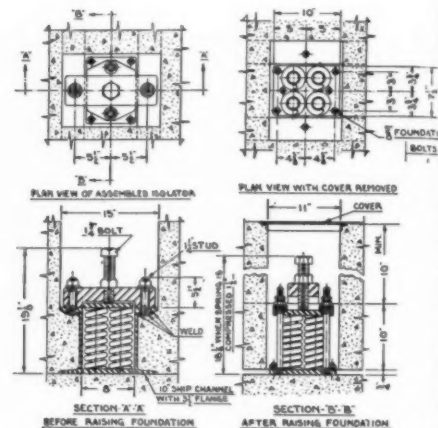
over size generator is installed to accommodate supercharging at an early date, which will increase the power of this unit to 810 hp. and in doing so, will alter somewhat the operating characteristics. With these conditions in view



Korfund Type UV/15 Vibro-Isolator

it was obvious from the beginning that for isolation purposes steel spring resilient mounting was necessary since it affords critical adjustment at any time either during or after installation.

Ten Korfund Type UV/15 Vibro-Isolators were specified for this job and support the foundation by means of steel work embedded in the concrete. A typical isolator of this type is illustrated to show how the longitudinal steel channels in the concrete base are carried on heavy steel springs in compression by means of



a steel yoke. The adjustment bolt in the center of this yoke is easily accessible through removable floor plates flush with the top surface of the concrete. Typical installation drawings show further the relation of this spring unit to

# POWER TO TOW!

Why the O'BRIEN BROTHERS replaced a "SLOW-SPEED DIESEL" with a new **MACK MARINER**

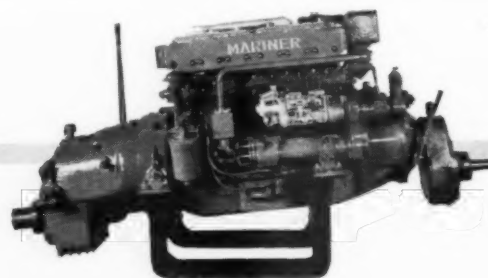


● Bucking an incoming tide—or fighting a cross rip with a loaded barge in tow is a tough job for any engine and always a problem for tugboat captains.

But the O'Brien Brothers have the answer. Against the field they matched the sustained towing power—the continuous, low-cost service record of the first Mack they bought 18 months ago. The answer—they repowered boat number

two with a new Mack Mariner.

Mack Marine Diesels range in size from 65 to 100 horsepower. Conservatively rated—built to "stand the gaff." Direct factory branch service at 28 tide-water and 14 fresh-water ports. Write Mack today for full details on the engine that's made to meet your needs.



(above) Mack Mariner 605W, 100 sustained h.p., at 1500 r.p.m., for continuous service, powers the "O'Brien Kids"—out of Rosebank, Staten Island, New York. Operates in New York Harbor and vicinity. Owned by O'Brien Brothers Shipyards, Inc.

MACK MANUFACTURING CORPORATION, Marine Engine Division  
Long Island City, N. Y.

MACK MARINE ENGINES ARE A PRODUCT OF THE BUILDERS OF WORLD FAMED GASOLINE AND DIESEL POWERED TRUCKS, BUSES, AND FIRE APPARATUS



the foundation both before and after resilient suspension has been effected. The Vibro-Isolators are placed in two rows of five each along the sides of the foundation and spaced longitudinally in accordance with the load supported.

The engine, generator, and concrete block are raised to suspension by the central adjustment bolt of each isolator and further critical adjustment if necessary can be made to eliminate almost 100 per cent of operating frequency transmission to the surrounding structure, yet this arrangement permits only the slightest vertical and lateral movement of the engine.

This advanced type of vibration isolation as developed by the Korfund Company is also being used with great success in connection with general industrial machinery as well as Diesel engines.

### F. M. Young Honored

F. M. YOUNG, President and founder of Young Radiator Company, was elected an honorary member of Alpha Chapter of Pi Tau Sigma, honorary Mechanical Fraternity, at a formal initiation ceremony and banquet held at Memorial Union Building, University of Wisconsin, Madison, Wisconsin, November 26, 1941.



F. M. Young

Mr. Young was honored by the fraternity in recognition of having "done much to advance the profession and to encourage young men to do likewise." Each year the fraternity chapter selects one or two outstanding mechanical engineers who have, in addition to the above qualifications, also "attained the goal to which they aspire."

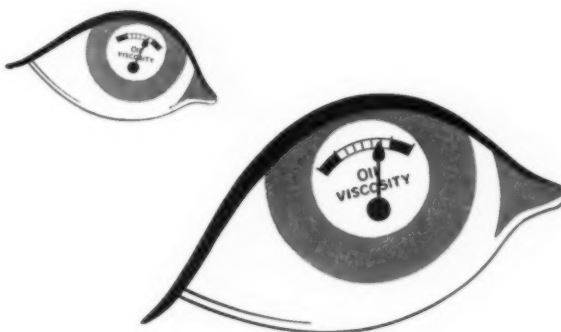
In accepting the honor, Mr. Young said: "It has been a source of happiness to me to have

been able to offer certain facilities upon various occasions to young men interested in the phases of engineering covered by our company's work in the fields of thermodynamics, heating, cooling, air conditioning and exchange of temperatures in various manners and structures embracing same. Basic engineering principles, research and product development have all been enhanced by our efforts with and for numerous engineering school students and graduates, many of whom are now permanent valued members of our organization."

### New Advertising Manager Named by Chicago Pneumatic

PROMOTION of Joseph A. Sullivan, Assistant Publicity Manager of Chicago Pneumatic Tool Company, to Advertising Manager was recently announced by Leslie S. Gillette, Sales Development Manager. The Advertising Department is located in the company headquarters at 6 East 44th Street, New York.

Joining the Chicago Pneumatic organization in 1928, Mr. Sullivan served until 1932 as head



## — you can believe your EYES

Every engineer concerned in the design or operation of internal combustion engines knows that lubrication unquestionably plays the most important role in any engine's performance...and that everything in lubrication has to do with *viscosity*.

Viscosity is at once the *most variable* and the *most important* factor in lubrication when the engine is in operation.

Merely maintaining a specified crankcase level of clean oil of a recommended viscosity is not necessarily proper *operating* lubrication. In fact, any and every instruction, method or test becomes meaningless unless the *viscosity* (lubricating ability) of the lubricant at crankcase temperatures is *visibly known at all times* while the engine is in operation.

VISCO-METER\* offers the one dependable means of *making sure* of safe, efficient, adequate engine lubrication.

Right before your eyes the VISCO-METER\* constantly shows the viscosity (lubricating ability) of the oil as it circulates in use.

In its construction and automatic operation the VISCO-METER\* is simplicity itself. Measured in terms of improving operating efficiency, savings in parts and prolonging service life, the VISCO-METER\* becomes a most important part of any engine...and will prove this in service on *your* engines.

If you design, manufacture or use internal combustion engines of any type we invite your request for a VISCO-METER\* engineer to call with the whole story. Write or wire:

**VISCO-METER**  
CORPORATION GROTE ST., BUFFALO, N. Y.

\*Fully covered by U. S. and Foreign Patents

## Created by AIR COMPRESSOR SPECIALISTS

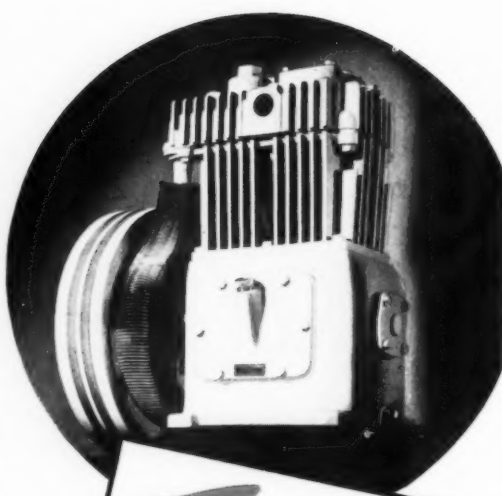
FOR DEPENDABLE DIESEL STARTING  
AND OTHER SERVICES

Quincy Compressor Co.'s entire organization—research, engineering, manufacturing, finance—is devoted exclusively to the designing and building of air compressors. This policy of specialization has resulted in a complete line of Quincy Compressors famous for their dependability and efficiency. Quincy Compressors are designed for Diesel starting services requiring pressures up to 500 lbs per sq. inch. Available in a wide variety of mountings with either gas engine or electric drive or a combination of both. If you have compressed air problems in connection with defense work, ask a Quincy Specialist to make recommendations.

**Quincy**  
COMPRESSORS

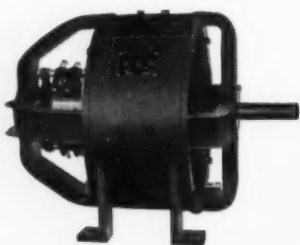
QUINCY COMPRESSOR CO.  
4111 Main St., Quincy, Illinois

Branch Offices: New York • Chicago • San Francisco • Cleveland • St. Louis



**COLUMBIA**

## A. C. and D. C. GENERATORS

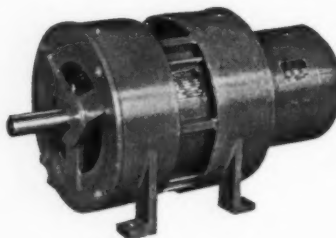


Dependable performance is one of the chief advantages of Columbia A.C. and D.C. Generators. They are designed and widely used for light and power service and are ideal for use as ship auxiliaries. They are light in weight, compact and can be furnished in single bearing type for direct connection to engines.

Columbia D.C. Generators range in size from 7½ to 200 KW, 36, 60, 125 and 250 volts and in speeds of 1750, 1450, 1150 and 850 R.P.M.

A.C. Generators sizes range from 1 to 300 KVA. Speeds: 1800, 1200, 900, 720, 600, 514 and 450 R.P.M. Single or three phase; direct connected or belted exciters.

Both A.C. and D.C. Columbia Generators are available for prompt shipment.



**COLUMBIA ELECTRIC MFG. COMPANY**

4519 HAMILTON AVENUE

CLEVELAND, OHIO

of the direct-mail division of the company's Publicity Department. From 1932 until 1935, Mr. Sullivan was with Sweet's Catalog Service division of the F. W. Dodge Corporation as copy chief. In 1935, Mr. Sullivan rejoined Chicago Pneumatic as assistant publicity manager, responsible for the creation and production of all sales literature pertaining to the company's diversified line of products.

Due to the greatly widened scope of its activities, Chicago Pneumatic's Publicity Department was recently reorganized as the Sales Promotion and Advertising Department under the direction of Mr. Gillette, to whom Mr. Sullivan will report.

## FOR DEFENSE



**BUY  
UNITED  
STATES  
SAVINGS  
BONDS  
AND STAMPS**

ON SALE AT YOUR POST OFFICE OR BANK

THE United States Maritime Commission has announced that contracts for the construction of twelve coastal tankers and four seagoing tugs have been placed. At a cost of approximately \$11,000,000, these vessels will be built by three shipbuilding companies, forming a part of the Commission's secondary or small ship program.

The Barnes-Duluth Shipbuilding Company, Duluth, Minnesota, will build eight of the coastal tanker vessels and delivery is to be made between June 1 and October 20, 1942.

The Lancaster Iron Works, Lancaster, Pa., will build the other four tankers, which are to be delivered between July 1 and October 1, 1942. Fabrication of the steel work will be done at its Lancaster plant and construction of the vessels at its shipyard at Perryville, Maryland.

Froemming Bros., Inc., Milwaukee, Wisconsin, will build the four seagoing tugs which are scheduled for delivery between August 1 and October 29, 1942.

Dimensions of the tankers will be 212 ft. long, 37 ft. beam, and 12 ft. draft and they will have direct Diesel propulsion, with a cargo capacity



of 12,660 barrels. These dimensions are such that the vessels can pass from the Great Lakes to the ocean.

The seagoing tugs are of new design and will be the largest commercial vessels of their type. They will be 194 ft. 9 in. in length, 27 ft. breadth, and 15 ft. 6 in. draft, and will be Diesel-propelled, each tug generating 2,250 hp.

Under its program and according to previously announced plans, the Maritime Commission has contracted for 127 vessels of special types which can be built without interfering with the emergency production of 1,200 larger ships. This program is apart from the Commission's major ship program.

★ ★ ★

**THE** American Barge Line Company, Inc. of Louisville, Ky., has placed a contract with the Jeffersonville Boat & Machine Company, Inc. of Jeffersonville, Ind., for the construction of a 170 ft. x 35 ft. x 9 ft. river towboat which is to be powered with a 2,000 hp. Diesel engine.

### New Engineering Bulletin For Diesel and Gas Industrial Engines

**HONAN-CRANE** Corporation of Lebanon, Indiana, has just released a new Engineering Bulletin No. 105M which contains complete information about Honan-Crane Continuous Oil Purifiers for Diesel and Gas Industrial Engines.

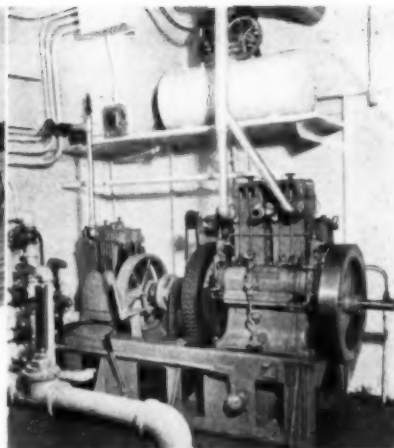


All of the new models of the Honan-Crane Continuous Oil Purifiers have been completely insulated and are now streamlined in design.

This oil purifier is now satisfactorily serving thousands of Diesel and gas engines under every kind of operating conditions and these



The Diesel Tug "North Star," shown here, and a sister ship, "North Wind," built by Lester F. Alexander Co. of New Orleans for the Minister of Munitions and Supply at Ottawa, carry Lister-Blackstone combination auxiliary units consisting of Lister Diesel engines driving compressors, generators, and pumps.



### TRUSTWORTHY DIESEL MARINE AUXILIARY UNITS OF PROVEN STAMINA AND FUEL ECONOMY.

The first all important requisite of Marine mechanism and gear is dependability. Lister Diesel trustworthiness has been proven in craft plying virtually every navigable body of water on the globe. Ruggedness, ease of maintenance, unsurpassed economy, and smoothness of operation on a wide range of fuels—these are Lister qualities that you can rely upon. Lister Diesel marine auxiliary units are furnished in standard sets and combinations, as well as to purchasers' specifications.

Send your specifications and ask for Bulletin 150

LISTER-BLACKSTONE, INC., MILWAUKEE, WISCONSIN

"Specials"  
s-l-o-w  
deliveries

● To serve all of our customers well . . . to assure adequate quantities of clutches vitally needed for defense jobs . . . means to maintain maximum production . . . the elimination of "specials" which require individual set-ups and short runs.

If by making a slight change in your unit, you can use a standard clutch, you not only speed the delivery of your own order but you help to increase the available supply of all clutches . . . help us to give a still better service . . . assure faster deliveries for all.

If YOU DO NOT HAVE THE INFORMATION ON our complete line of standard clutches for industrial use, showing types and sizes that are available, ask for our engineering bulletin covering your needs. **TWIN DISC CLUTCH COMPANY, 1345 Racine Street, Racine, Wisconsin.**

LEFT: Twin Disc Power Take-off for engines having up to 285 hp. output. Sizes: with single plate clutches, 6½" to 24"; double plate, 11½" to 18". Housing sizes: No. 6 S.A.E. to No. 00 S.A.E.

RIGHT: Twin Disc Model E Clutches, heavy-duty, enclosed type. Sizes: 14" to 42" in single or two plate assemblies.



**TWIN DISC**  
CLUTCHES AND HYDRAULIC DRIVES  
REG. U. S. PAT. OFF.

## Users of YM Oil Purifiers have 2 Great Advantages


1. They do not pay fancy prices for common earth marketed under trade names.
2. They can remove fuel dilution and all other contaminants. No other purifier built anywhere can do a better job.

CLEAN OIL — CLEAN ENGINES



YOUNGSTOWN MILLER CO., INC.  
SANDUSKY, OHIO

**Penn Points**



Protect your investment, avoid costly shut-downs, with Penn Automatic Controls for Diesel engines. Write for Bulletin E100.

**PENN ELECTRIC SWITCH CO.**  
GOSHEN, IND.

**CLEANING PROBLEMS SOLVED WITH**

D. C. METAL CLEANER & D. C. STRIPPER, STEEL & IRON PARTS CLEANERS, RUST REMOVER, METAL ETCHERS and D. C. PASTE CUTTING COMPOUNDS.

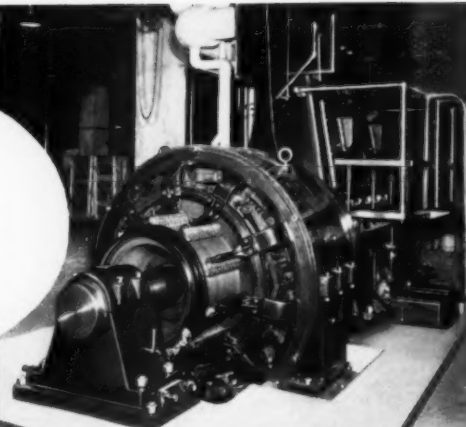
Serving many largest nationally known concerns.

Write for particulars

**D. C. COOPER CO.**  
22 E. 18th ST., CHICAGO, ILL.

**BURKE A-C-D-C GENERATORS**

BURKE, not one of the biggest names in generator construction, but certainly one of the oldest, has always been known for quality rather than quantity. Today, with the spur to more power in a hurry, Burke quality goes into 24-hour production lines to provide Diesel Engine users with a husky well-built A. C. or D. C. Generator or Motor to meet any specified conditions up to 1000 K. W. or 1000 H. P. Write for specific information.



**BURKE ELECTRIC CO** Erie, Pa.

new features make the Honan-Crane Continuous Oil purifier the finest equipment you can buy.

Bulletin 105M covers Honan-Crane Purifiers having a capacity for handling lubricating oil of engines having a rating of 30 hp. to 5,000 hp. Complete details of operations and mechanical specifications are given along with illustrations of the equipment. If you are operating any kind of Diesel or gas engine, you should send at once for this new Engineering Bulletin.

### FOR DEFENSE



**BUY  
UNITED  
STATES  
SAVINGS  
BONDS  
AND STAMPS**

ON SALE AT YOUR POST OFFICE OR BANK

### 50 Years—Brown, Boveri & Co.

ON October 2nd, 1941, Brown, Boveri & Co., Ltd., of Baden, Switzerland, completed the first half century of its existence. Charles E. L. Brown, elder son of an English mechanical engineer, who had settled in Switzerland in 1851, had acquired prominence throughout Europe as designer of the three-phase generator and transformer used in the world's first long-distance power transmission. This line, running from Lauffen on the Neckar River in Wurttemberg to Frankfurt-on-Main, a distance of about 110 miles, transmitted 230 kva. at 25,000 volts, to the exposition of the International Electro-technical Congress in 1890.

The many contacts made during this international gathering brought to maturity the plans which Charles Brown and Walter Boveri, a young mechanical engineer working in the same organization, had been secretly discussing for almost three years, plans to found their own firm, devoted to the production of electrical machinery and apparatus. This firm, Brown, Boveri & Co., was incorporated on October 2, 1891, and started actual production at the beginning of February, 1892, with a staff of 120 employees. Charles Brown's younger brother, Sidney W. Brown, had joined the organization to take charge of computation and design and Fritz Funk supervised the commercial department. None of these four founders



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engineering

participated in the fiftieth anniversary. Charles Brown and Walter Brown passed on in 1924, Fritz Funk in 1938, and Sidney Brown only two months before the completion of the half century, on August 1, 1941.

During the first decade, the firm participated in the rapidly growing demand for electrical machinery in all the industrial countries of Europe and increased its staff to 1800 men. From the beginning it already had been clear to the founders that the limited market in Switzerland could not support their enterprise in the long run. The larger neighboring countries offered considerably greater possibilities and thus Brown Boveri set out to organize or acquire a controlling interest in a number of affiliated organizations in Germany, France, Norway, Italy, Austria-Hungary, etc. This trend of de-centralized manufacture within the various important market areas, but with concentration of basic design, research and new development in the parent company in Switzerland, continues to this day.

Before the outbreak of the present war in Europe the Brown Boveri concern included thirty-seven separate factories in sixteen different countries. Some affiliations which existed in former years (i.e. the American Brown Boveri Electric Corporation in Camden, N. J.) had to be discontinued later on due to certain developments beyond the control of the parent company.

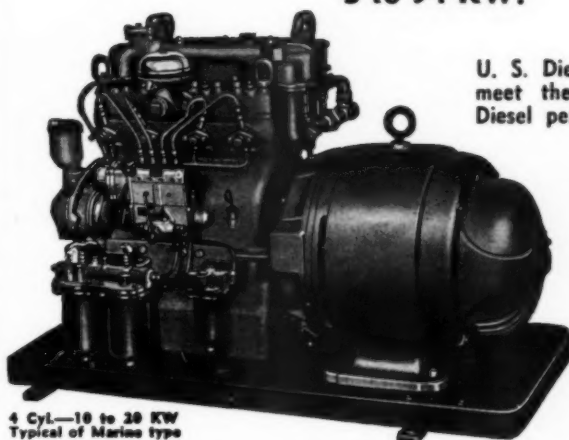
Even with this large number of foreign factories 80% of the total production of the Swiss works is exported mostly to overseas countries. In the field of steam turbines, compressors or other non-electrical equipment, up to 97% of the total production in Switzerland is intended for foreign installations. This shows clearly that the basic policy of expansion, originated by the founders, is still justified even now.

At the present time the total number of employed at the home plant is 7200 while the entire concern including foreign affiliates provides employment for over 40,000 persons.

From its foundation the success of the company was largely due to the pioneering development, the initiative in attacking new problems and to the perseverance in exploring unknown regions in electro-technics and thermo-dynamics. The logical continuation of these policies, always with greatest emphasis on research, has been responsible for the growth of the enterprise and will, without any doubt, allow it to hold its place among the manufacturers of similar equipment in the world.

# "U.S." DIESEL ELECTRIC PLANTS

3 to 94 KW.



4 Cyl.—10 to 20 KW  
Typical of Marine type

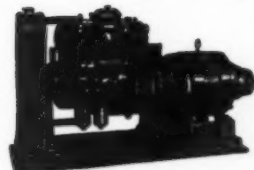
U. S. Diesel Electric Plants are built to meet the highest standards of modern Diesel performance. Safety . . . smooth running . . . easy starting . . . and economical operation — are the *plus values* which you get in a U. S. Diesel Electric Plant. One, two, four and six cylinder models, 3 to 94 KW. Complete lines for both marine and land service. Write for full information.

**U. S. MOTORS CORP.**

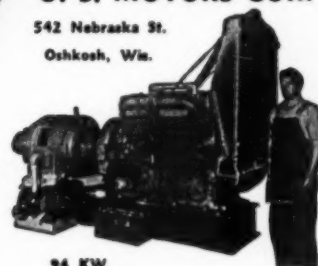
542 Nebraska St.  
Oshkosh, Wis.



2 Cyl. 5, 7½, 10 KW.



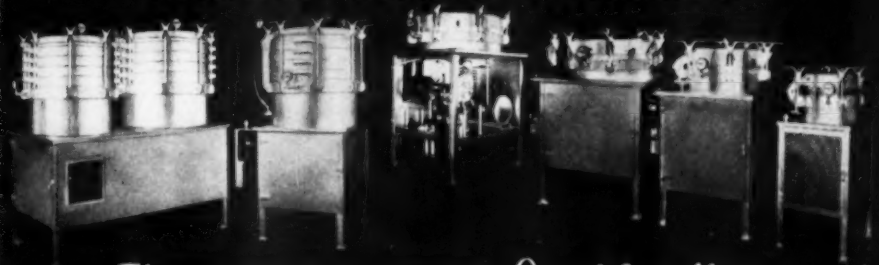
6 Cyl. 25-60 KW.



94 KW.

## HILCO Oil Reclaimers

COMPLETE—COMPACT—CONTINUOUS



*There's a HILCO for every size Diesel Installation*

### CHECK THESE FEATURES

- ✓ The HILCO Oil Reclaimer will produce an oil free of carbon, sludge, moisture, fuel dilution, acid and tarry matter plus good color.
- ✓ HILCOS are being direct-connected to one or more engines for continuous or intermittent by-pass purifying to remove contamination as it is formed.
- ✓ You may use The HILCO as a batch reclaimer if you prefer draining the lube system. A combination hookup can be arranged for both by-pass and batch operation.
- ✓ There is a model having sufficient capacity for every Diesel installation.

*Write for FREE literature—See what other operators are doing with HILCO Oil Reclaimers.*

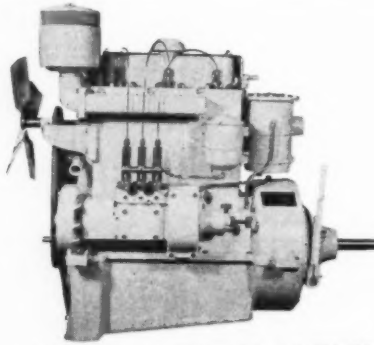
**THE HILLIARD CORPORATION**  
122 WEST 4TH ST. ELMIRA, N. Y.

## COMPLETE PACKAGED POWER UNITS

The SHEPPARD, full Diesel engine of all American design and manufacture is complete with all necessary operating accessories and generator to match or power take-off—"ready to run." Bolt this power package down—fill the fuel tank and put it to work.

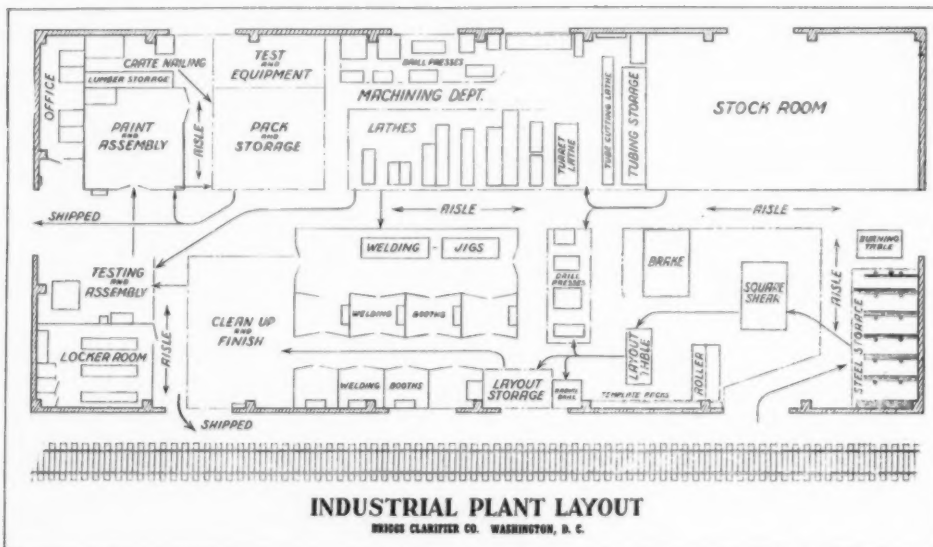
"Write for full particulars"

**R. H. SHEPPARD COMPANY • HANOVER, PENNSYLVANIA**



Model 6, three cylinder, 25 h.p. SHEPPARD Diesel engine

## New Oil Clarifier Plant Employs Modern Production Methods



THE importance of oil clarifiers to engine maintenance and operating economy (fully established in recent years by hundreds of exhaustive and unbiased tests) is re-emphasized today as never before by the stress and overloads of Defense production efforts. Many

plants, for example, are showing a 100% increase over the 1940 output. Marine and transport units likewise are working overtime, with little opportunity for overhaul or repair. Operating under such severe conditions as these, engines require a constant supply of clean fuel

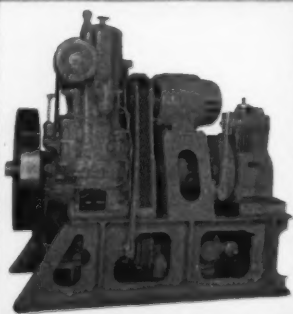
and lube oil if disastrous breakdowns are to be avoided. Diesel operators recognize this fact today, and are taking no chances on costly engine failures where proper oil clarification can prevent them.

To deliver continuously not merely filtered oil but lube oil that is chemically clean—that is the job which today's clarifier must do. To meet the increased demands of industry and government for lube oil and fuel oil clarifiers, the Briggs Clarifier Company of Washington, D. C., recently modernized its industrial plant facilities, with a new, streamlined production plant that takes rolled steel from the steel mill at one end and turns out a variety of finished clarifiers ready for shipment at the other end. The final products are going into the Navy's fast-building Diesel ships, to the Maritime Commission for its own extensive ship-building program, to the airplane engine builders for test blocks, into railroad Diesel streamliners, and for industrial and transport operators throughout the country, in Canada and South America.

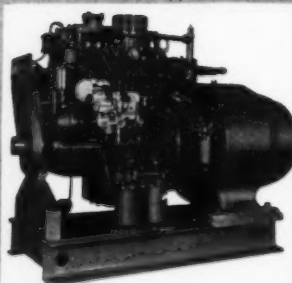
The plan for Briggs' new industrial unit is simplicity itself, allowing for the complete manufacture of all types of marine and industrial engine oil clarifiers, with a minimum of delay and manufacturing cost, and a maximum amount of efficient, economical production. This plant is located on River Road, Bethesda, Maryland, on the same Baltimore & Ohio Railway spur that extends to the Briggs automotive plant in Washington, D. C.

The industrial unit consists of sheet steel storage provisions, a shearing, rolling and forming division, layout and drill division, a large

## REINER DIESEL Marine Auxiliary Units



- Marine auxiliary units 5 to 60 hp., 1 to 6 cylinder.
- With any generator—pump—compressor combination required.
- Generator sets 3 to 75 kw.
- Special auxiliary units designed to individual requirements.



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## ATLANTIC Seamless Welded Steel Hose for DIESEL ENGINE EXHAUST

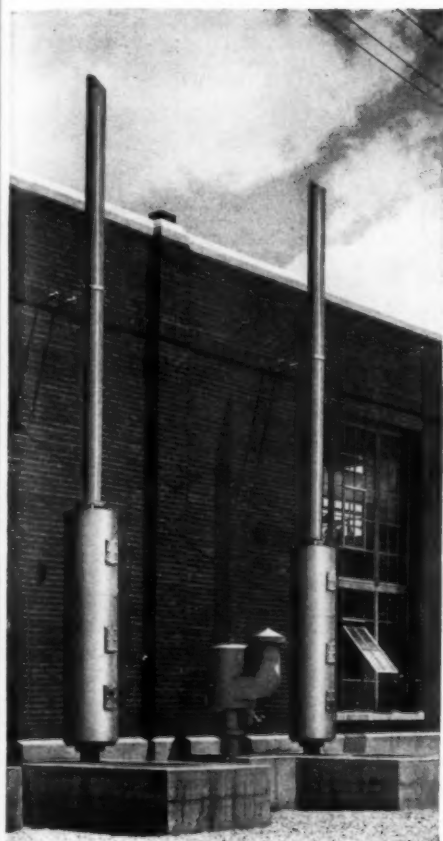
HIGHLY recommended for diesel exhaust and air intake by leading diesel engine manufacturers, Naval Architects and Engineers.

Cannot leak or burn out; has no interlocking joints to loosen; no packing to rely on for tightness; eliminates vibration; furnished in sizes from 1" to 36" I.D. inclusive; supplied with forged steel flanges or nipples in length desired, straight or bent to blue-print specifications.

In service in Industrial Plants, U. S. Navy, Railroads, Marine, etc.  
For complete information, write for Bulletin No. 10-B.

**ATLANTIC METAL HOSE CO., Inc.**  
102 W. 64th STREET NEW YORK





## MAXIM SILENCERS BLACKOUT EXHAUST NOISE



The installation above shows Maxim Silencers in operation at the new power plant in Odessa, Missouri.

The silencers shown are the exhaust type, but Maxims are also built to silence engine or compressor intakes, and high or low pressure steam exhaust or blow-off. Maxim engineers will be glad to recommend the correct silencer for your particular problem.

And here's something worth remembering today: MAXIMS ARE BUILT TO LAST LONGER!

**THE MAXIM SILENCER CO.**  
94 Homestead Ave. Hartford, Conn.

machine shop for the machining of parts, a welding division consisting of eight welding booths, and one large assembly booth, clean-up and finish division, test and assembly division, painting and packing division and, of course, shipping department. In addition to these manufacturing facilities it has a large stock and tool room all under the same roof. The diagram shows the simple line production layout of the manufacturing and assembly lines by which these Briggs Clarifiers are made in a steady flow, from steel storage to shipping, many models being completed in two eight-hour shifts. A moderate sized, but efficient crew comprises the personnel which the industrial plant requires to operate at its present full production capacity.

★ ★ ★

**GENERAL MOTORS** Sales Corporation, New York, has awarded a contract to the Gulfport Boiler & Welding Works, Port Arthur, Texas, for two more tugboats to be equipped with 950 hp. Diesel-electric engines. These will be 90 ft. in length, 23 ft. beam, and 10 ft. deep, 175 gross tons each, and will be known as hulls 203 and 204.

### New Periodical on Water Treatment

**AMERICAN K.A.T.** Corporation is periodically publishing an informative series of bulletins on latest developments and current results being obtained in the treatment of water for boilers, stills and evaporators.

This periodical, which is entitled "WATER MARKS", carries concise technical explanations of various methods of water treatment, with special reference to the reasons for the rapidly increasing use of all-organic colloids.

In addition, each issue contains short news items describing how plants in various industries have solved their water treatment problems, and notes on securing best results in the operation of boilers, stills and evaporators.

Engineers and plant executives who are interested in the subject of water treatment can obtain copies of "WATER MARKS" by writing to American K.A.T. Corporation, 122 East 42nd St., on their company stationery.

### Metal Cleaning Process

Of general interest to Diesel engine manufacturers is a group of chemical and alkali cleaners broadly identified as D.C. Cleaners. The trade names of a few items of this group serve best to describe briefly their purpose and use.

## BLACKMER • ROTARY • PUMPS

Wherever Diesel Power is Used



Direct-Connected Pumps

In diesel fuel service on boats, where absolute dependability is so essential, Blackmer pumps are used on many types of craft—both Naval and private construction.



Reduction geared Pumps

For fuel transfer and supply, Blackmer rotaries have been in service for more than thirty years.



Hand operated Pumps

Blackmer hand pumps are standard equipment for fuel transfer on many types of diesel powered construction equipment.

THE PUMP THAT IS SELF-ADJUSTING FOR WEAR  
**FAMOUS BUCKET DESIGN**

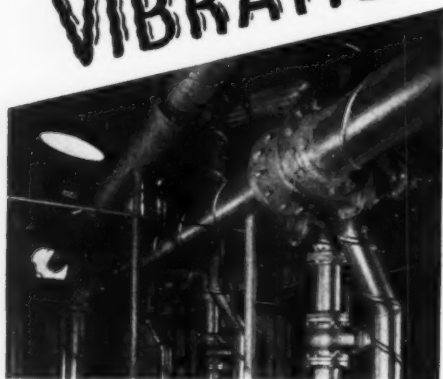
The only pump in the world with this economy feature; self-adjusting for wear, which assures constant efficiency—no drop in volume due to wear. When buckets (swinging vanes) are finally worn out, a 20 minute replacement job restores the pump to original volumetric efficiency.

Write for catalog and new Engineering Pump Bulletin with helpful information on modern liquid transfer practice. Free to pump users.

**BLACKMER PUMP COMPANY**

1961 Century Avenue, S.W., Grand Rapids, Michigan

## NAYLOR EXHAUST AND INTAKE PIPE Built to take VIBRATION



Here's why more and more diesel operators are specifying Naylor Pipe for intake and exhaust lines.

Naylor's exclusive Lockseam Spiralweld structure provides a leak-tight pipe with extra strength and safety found in no other light-weight pipe. The lockseam spiralweld serves as a continuous expansion joint which absorbs vibration, shock loads, expansion and contraction, providing long, durable, maintenance-free service. Sizes from 4" to 30" in diameter with all types of fittings and connections and complete fabrication service.

Write for Naylor Catalog  
or send specifications for quotation.

**NAYLOR PIPE COMPANY**  
1765 EAST 92nd STREET • CHICAGO, ILLINOIS

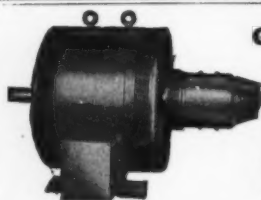
CHECK  
YOUR FUEL  
SUPPLY  
AT A  
GLANCE



Write for Bulletin

THE LIQUIDOMETER CORP.

32-24 Skillman Ave., Long Island City, N. Y.



### GENERATORS

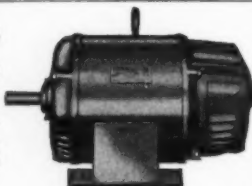
AC and DC  
3 to 150 kw.

For Diesel and  
gasoline en-  
gine drive

### MOTORS

AC and DC  
¼ to 200 hp.

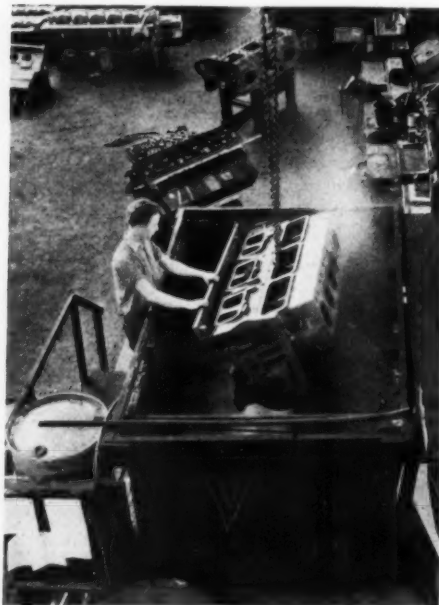
For all appli-  
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tionary and  
Marine



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They are D.C. Stainless Steel Cleaner, D.C. Metal Parts Cleaner, D.C. Rust Remover, D.C. Stripper (for stripping paint from metal), D.C. Oxidizing Compound (for coloring steel blue-black), Rust Preventatives, etc. The cleaning process consists of immersing the parts to be cleaned in a tank containing a solution of the semi-powdered Cleaner in water heated to 210° F. The process is said to be fast, free from obnoxious fumes, leaves no white ashy film on the parts, and prepares the parts for painting or plating.



Shown here is illustration of a huge immersion tank, 22' long, 18' wide and 10½' deep with a cylinder block being lowered for cleaning in a large Diesel engine plant. The tank itself is built of heavy boiler plate, welded, and is fitted with a heating device and automatic temperature control. D.C. Cooper Co., 22 East 18th St., Chicago, manufacturers of these cleaning compounds and tanks, invite readers of DIESEL PROGRESS to submit their metal cleaning problems.



**SAVES TIME  
WHEN SETTING  
Diesel Engines**

### L-R TYPE H-Q

Heavy duty flexible coupling requires no lubrication. One body has separate jaw ring, permitting rotation of either shaft independently. Set or time engine without tearing down coupling. Big time saver.

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**NORDBERG  
DIESEL ENGINES  
STATIONARY-MARINE**

Two Cycle Type  
750 to 6500 H. P.

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**AMERICAN BOSCH  
FUEL INJECTION EQUIPMENT**

AMERICAN BOSCH CORPORATION  
SPRINGFIELD, MASSACHUSETTS



## ONLY BUCKEYE DIESELS



### GIVE YOU ALL THESE FEATURES

1. Silent Watchman (Patented).
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3. Sleeve cylinders.
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5. Reversible shell type silver alloy bearings.
6. Individual pump for each cylinder.
7. Completely enclosed.

They insure long life, high efficiency, low maintenance—all meaning lower power costs. Write for catalogs on your letter-head.

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for installation by  
DIESEL ENGINE BUILDERS



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WORLD'S LARGEST AND EXCLUSIVE  
MANUFACTURERS OF HYDRAULIC  
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BALL • ROLLER • THRUST

for every load, speed and duty

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Stamford, Conn.

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for MOST  
EFFICIENT  
DIESEL ENGINE  
LUBRICATION



Model "94"

Deliver more oil when engine speeds up, less when it slows down, and none at all when it stops.

Sight glasses on Model 94 show actual amount of oil being delivered at lubrication points.

Once feed is set, Manzels require no attention except to keep oil reservoir filled.

Provide dependable lubrication on thousands of Diesel engines.

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Satisfaction VALVE SEATS  
Guaranteed HARD SURFACED

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New York

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New York City

SAFETY CONTROLS  
ALARM SYSTEMS  
TACHOMETERS  
FOR DIESEL ENGINES  
VIKING INSTRUMENTS, INC.  
Stamford, Connecticut

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ORIGINATORS OF  
the famous  
TWIN TYPE  
STEELBESTOS



WE SPECIALIZE  
IN PRODUCTS  
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EQUIPMENT

DETROIT GASKET & MFG. COMPANY • DETROIT

**DIESEL ENGINES**  
**AMERICAN LOCOMOTIVE CO.**  
DIESEL ENGINE DIVISION  
AUBURN • NEW YORK



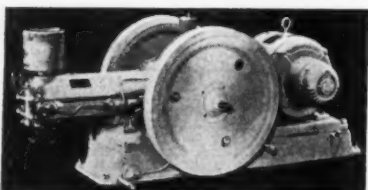


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LARGEST BUILDER OF SMALL DIESELS

**Lower Your Cost of  
Filter Maintenance with  
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**MICHIANA FILTERS**

MICHIANA PRODUCTS CORP., Michigan City, Indiana

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**HEAVY DUTY VALVES**

Valves and Seats—For All Types  
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Write for Full Information!

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TOMBALL JACOB MOTOR PRODUCTS CO.

### West Coast Diesel Marine News

THE all-welded steel tug *Enterprise*, equipped with a 6 cylinder, 12" x 15", 400 hp., *Enterprise* Diesel, came through with better than eleven knots on her trials before going into service on San Francisco bay. Built by the Pacific Coast Engineering Co., Alameda, California, for the S. F. Towing Co., the 65 ft. craft is equipped with fresh water cooling, a 68" x 36" Pitchometer wheel, Maxim silencer, Exide batteries, and has two Fairbanks-Morse Diesel auxiliaries driving generators, air compressors and bilge pumps.

TWO Cummins Diesels repower The Star and Crescent Boat Company's 65 ft. *Sea Angler*, sportfishing craft. They are 6 cylinder, 125 hp., at 1,650 rpm., and are equipped with Twin Disc gears. A 200 hp. Cummins Diesel installed in a Star and Crescent 43 ft. water taxi, with Twin Disc gears and Monel metal shaft, now turns out fifteen knots at 1,800 rpm.

### OPA Freezes Diesel Prices

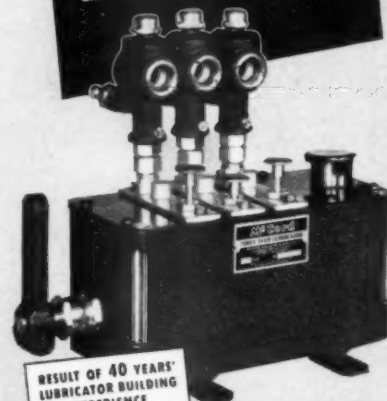
INFORMAL arrangements whereby Diesel engine prices will not be increased above the levels of October 1 will be continued for the present, Leon Henderson, Administrator of the Office of Price Administration, announced recently.

On December 6, the Administrator requested Diesel engine manufacturers to adhere to October 1 prices and not to change their methods of determining prices for specially designed equipment. A meeting at which makers of 85% to 90% of all Diesel engine manufacturers were represented was held December 18 at the OPA offices. Attending producers expressed the opinion that the voluntary method of keeping prices stabilized would be effective for the time being.

To implement the voluntary price control program, however, Diesel engine manufacturers will be asked to file with OPA affirmations that they have complied with his request of December 6. Mr. Henderson disclosed that plans were being made to form a Diesel engine industry advisory panel from which committees could be drawn from time to time to furnish OPA with such technical information as it may require.

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